

# **MODEL SSM**

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## **Synth and Line Mixer**

- | **Model SSM-24**
- | **Model SSMEX-16**
- | **Model SSMEX-32**

## **Operation Manual**

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# Introduction

## General

Thank you for purchasing our Model SSM Synth and Sampler Mixer. The Model SSM was designed from the ground up as a high performance mixer dedicated to the professional synth player.

The Model SSM has operational features that are unique to our products and are somewhat technical in nature. We hope this manual is easy to understand. If you have any questions regarding the Model SSM or any Speck product, do not hesitate to contact Speck Electronics. Our phone number is (760) 723-4281.

## Operator Safety Summary

### Power source

This product and its power supply are intended to operate from an AC power source that does not apply more than 240 Volts RMS between the supply conductors or between either supply conductor and ground.

### Grounding the product

The external power supply for the Model SSM is grounded through the grounding conductor of the power cord. To avoid electrical shock, plug the power cord into a properly wired receptacle before making any audio connection to the mixer. A protective ground connection, by way of the grounding conductor in the power cord, is essential for safe operation.

Upon loss of the protective ground connection, all accessible conductive parts, including knobs and controls that may appear to be insulating, can render an electric shock.

Use only the power cord and connector that is supplied with your power supply. The power cord must be in good condition.

### Use the proper power cord

To avoid a fire hazard, use only a fuse of the correct type, voltage rating and current rating as specified on the chassis of the power supply and this manual.

### Use the proper fuse

Two fuses are required for the operation of the Model SSM. One fuse is for the main mixer and optional expander (if installed), and the other is for the headphone circuit on the main mixer.

Refer to the section in this manual regarding specific details on fuses.

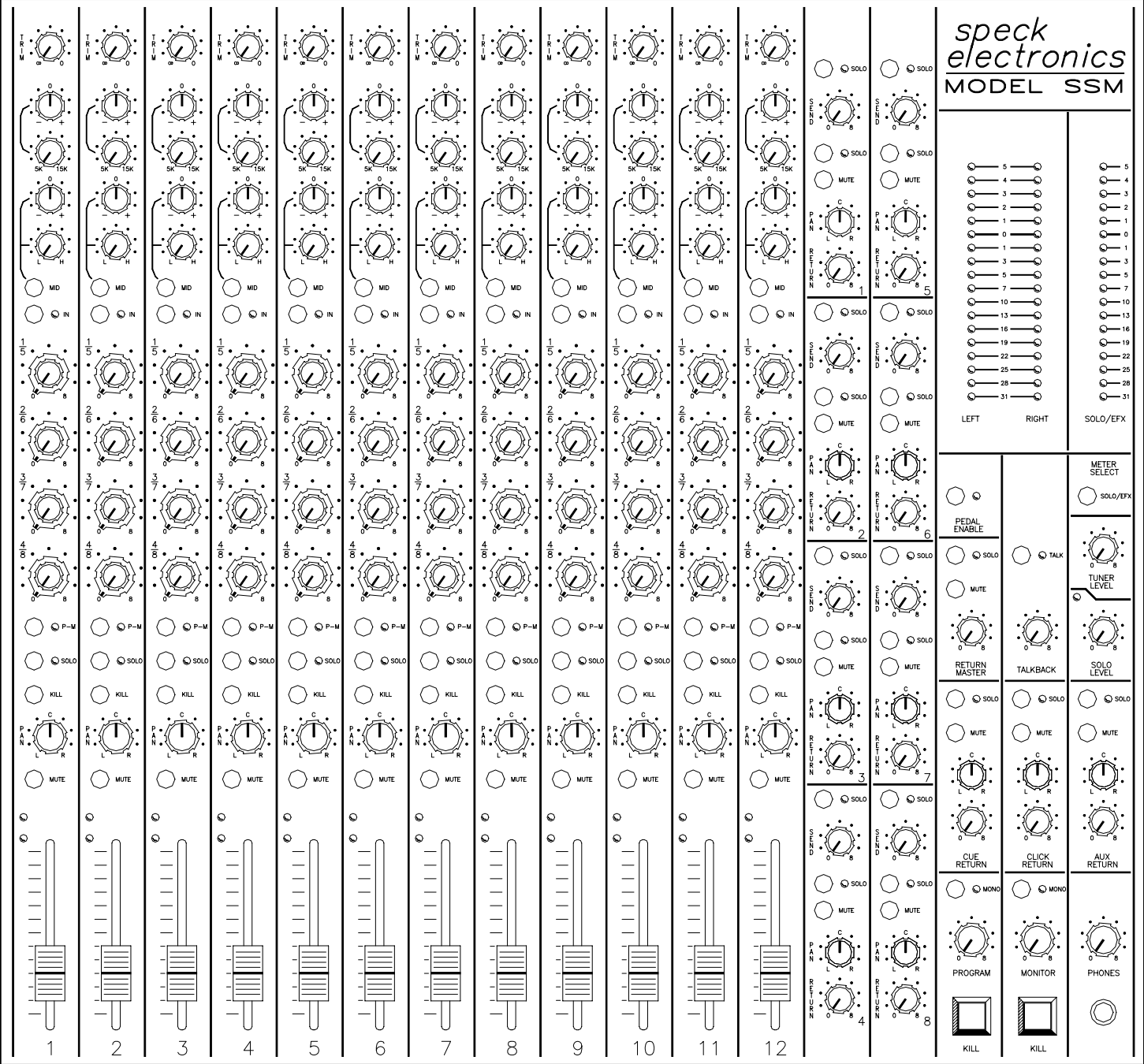


Figure 1. Front Panel Layout

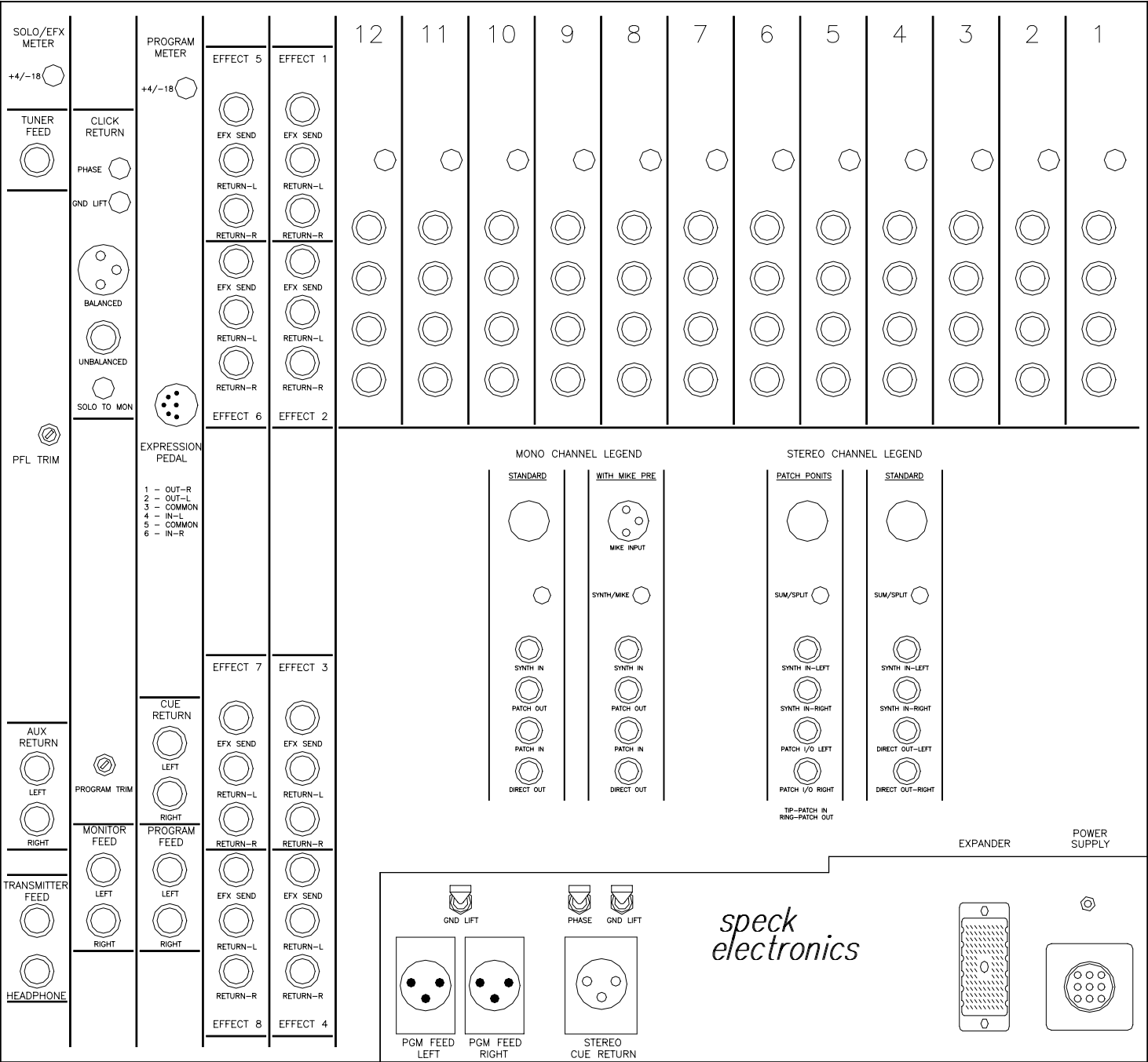


Figure 2. Rear Panel Layout



**Do not remove covers or panels**

To avoid personal injury, do not remove the cover from the power supply, or the rear panel of the Model SSM or optional Expander. Never operate the external power supply without the covers and panels properly installed. If it becomes necessary to remove the rear panels of the SSM or optional Expander for service, always unplug the AC power and disconnect the DC interface cable before proceeding.

**Ground Terminal**

A grounding terminal is available at the rear of the SSM and the optional Expander. This terminal is available when a star grounding technique is employed as part of a larger wiring system. The ground terminal must not be used as a substitute for the power supply's AC grounding conductor.

**General Description**

The Model SSM is a dedicated synthesizer and sampler audio mixer that may be used separately or as part of a larger mixing system.

When used as a traditional synth and sampler rack mixer, the Model SSM provides up to 56 synth inputs (28 stereo inputs), and the ability to access up to 8 stereo effects devices. The SSM has a comprehensive master section that allows the synth player to maintain total control over all equipment connected to the mixer.

The mixer is divided into three basic sections. The input section, the effects send and return section, and the master section. The optional Expander has 16 input channels identical to that of the main mixer.

**Input section**

The input section consists of 12 input channels that are available as either mono input or stereo inputs. The input channels have all the controls necessary to effectively control synth and sampler operation.

Channels include synth trim, sweepable equalization, independent effects sends, a pan/balance control, the ability to mute or solo the signal, and an overall level control. The rear panel for each input channel offers 1/4" T.R.S (tip, ring, sleeve) balanced connectors for synth or sampler interface, as well as 1/4" connectors for direct outputs and patch points.

The optional Expander has 16 input channels that are available as either mono or stereo inputs. Its features are the same as those mentioned above.

**Effects section**

The effects section provides total control for up to 8 stereo effects devices.

Each of the effects channels include an effects send master and associated solo. The effects return includes a stereo effects return level, pan, in-place solo, and mute. Each effects channel has a 1/4" send jack and two 1/4" jacks for the left and right effects returns.

**Master section**

The master section provides the SSM with many choices for routing and controlling the synth signals from the input section and effects devices from the effects section.

The master section includes a stereo program, stereo monitor, and stereo headphone controls. The stereo cue, stereo aux, and mono click return sections allow a variety of signals to be mixed with the synth signals to the monitor and headphone outputs. The master section provides a full compliment of 1/4" and XL type input and output connectors that allow the SSM to adapt to a wide range of professional situations.

**Features**

The SSM mixing system is available in three models: the SSM-24, 12 stereo input channels; the SSMEEX-16 Expander, 16 mono channels; and the SSMEEX-32 Expander, 16 stereo input channels.

The mixers can be rack mounted vertically or horizontally using the optional slide/tilt accessory. This can save up to five rack spaces.

The "Zero flex" integrated chassis design is virtually impervious to rack stresses.

Eight discrete effects sends per channel are complimented by eight stereo effects returns.

Each stereo or mono input channel employs a unique channel "Kill" switch that deletes the dry input signal from the stereo program but leaves all other functions, such as the effect send and channels direct outputs, active.

Presence of signal LED's show which inputs are active at a glance.

Impedance balanced patch points allow for long connections to a passive stereo volume pedal for dynamic control of the entire mix.

A separate tuner output follows the solo for quick isolation.

## Standard Accessories

### Regulated power supply

The SSM is supplied with an external rack mount power supply that is capable of powering the Model SSM main unit and one additional Model SSM 16 input channel expander.

The SSM requires the Model PS3-1.5 regulated power supply.

The power supply is supplied with a 6 foot, 3 conductor AC power cord and a 8 foot shielded DC cable. The DC cable has a circular locking connector that insures a positive connection to the SSM.

### **CAUTION!**

ALWAYS CHECK THE PROPER OPERATING VOLTAGE BEFORE OPERATING THE SSM.

### **IMPORTANT!**

USE ONLY THE POWER SUPPLY THAT IS SPECIFIED FOR YOUR PRODUCT.

### Rack Mount Adapters

The Model SSM and optional Expander are supplied with a set of rack mount adapters. If the intention is to mount the SSM in a standard 19" equipment rack, these adapters must be mounted to the left and right sides of the mixer.

### Interface Harness (Expander only)

The optional 16 channel SSM Expander is supplied with a 6' interface harness. This harness is required to connect the Expander to the Main Unit. The harness consists of high quality, shielded multiconductor cable with 38 pin Elco connectors attached at each end. Shorter cable lengths are available from the factory.

## Optional Accessories

### SSM 16 Input Expander

The Model SSM is prewired for input expansion. With the addition of the 16 input Expander and its interface harness, a SSM Mixing System may be expanded to a total of 28 positions (56 inputs).

Expanders are available in two versions: the SSMEEX-32, 16 stereo channels; and the SSMEEX-16, 16 mono channels. All input channel functions, stereo or mono, are identical to those found on the main SSM mixer.

### Assign 28 Subgroup Module

The Assign 28 is an assign/subgroup module that is designed as an output expander for the Model SSM series mixers. The Assign 28 allows multiple sample drum sounds or multi-synth patches to be combined and discretely bussed in a recording console fashion, but with dedicated effects.

This three rack space module incorporates 28 stereo or mono assign banks, 8 master outputs, 8 stereo effects returns, a complete monitoring section, and a stereo grand master feed.

Any mono or stereo input channel from the Model SSM may be assigned to any of eight buss outputs. The eight busses may be used as individual outputs or as stereo groups. The eight busses have an associated level control and may be muted with a master kill switch. The 8x2 monitor section provides an isolated solo capable mix of the eight busses to the SSM for complete monitoring flexibility. Eight stereo effects returns may be used in conjunction with, or in addition to the SSM's existing effects returns.

**Microphone preamps**

Mono input channels are available with microphone preamps as an option. Channels with mike preamps incorporate a high quality microphone transformer, a XL type input connector, and a Mike/Synth select switch. Any quantity may be ordered and may be installed in any input position of the Main Unit or the Expander. Mike preamps are not available on stereo input channels.

**Rack mount Slide/Tilt adapter**

The SSM main unit or 16 channel Expander may be fitted with an optional rack mount slide and tilt mechanism in place of the standard vertical mount rack adapters.

The slide/tilt option will allow the SSM to be mounted flat, like a sliding drawer, and moved in and out of a standard 19" equipment rack. When moved to the front of the rack, the mixer may be tilted and locked into a 0, 45 or 90 degree position. For traveling, the mixer may then be pushed back into the rack in its flat horizontal position.

**Expression pedal harness**

An optional wire harness is available to connect the Model SSM to a stereo volume pedal (not available from Speck). This 20' harness is wired with a 6 pin DIN connector at one end and four 1/4" plugs at the other end. The use of the expression pedal allows the operator a "What you hear, is what you get" master volume control adjustment from the stereo program, monitor and headphone outputs of the SSM.

## Specifications

Synthesizer Input Impedence	10k Ohms
Patch Point Return Impedence	10k Ohms
Effects Return Input Impedence	10k Ohms
Cue Return Input Impedence (Unbalanced)	10k Ohms
(Transformer Isolated)	600 Ohms
Click Return Input Impedence (Unbalanced)	10k Ohms
(Transformer Isolated)	600 Ohms
Aux Return Input Impedence	10k Ohms
Microphone Input Impedence (Optional)	150 Ohms

Patch Point Output Impedence	All line outputs are designed to drive a 600 ohm load and may be operated into any load 600 ohms or greater.
Direct Out Impedence	
Effect Send Output Impedence	
Program Feed Output Impedence	
Monitor Feed Output Impedence	
Tuner Feed Output Impedence	

	<u>Normal</u>	<u>Maximum</u>
Synth Input Level	-20dBu	+15dBu
Patch Point Input Level (High Level Synth)	0dBu	+21dBu
Effects Return Input Level	+4dBu	+21dBu
Cue Return Input Level	+4dBu	+21dBu
Click Return Input Level	0dBu	+21dBu
Aux Return Input Level	+4dBu	+21dBu
Microphone Input Level	-50dBu	+5dBu

	<u>Normal</u>	<u>Maximum</u>
Direct Output Level	+4 dBu	+21dbu
Program Feed Output Level	+4 dBm=0VU	+21dBm
	-18dBm=0VU	+21dBm
Monitor Feed Output Level	+4dBu	+21dBu
Effects Send Output Level	+4dBu	+21dBu
Tuner Feed Output Level	+4dBu	+21dBu
Transmitter Feed Output Level	-10dBu	+21dBu
Headphone Output Level		4 Watts

	<u>Normal</u>	<u>Maximum</u>
Output Distortion(THD+n)	.005% @+4dBm	.0072% @+22dBm

Frequency Response	12Hz(-3dB) to 160kHz(-3dB)
(Synth In to Program Out)	18Hz (-.5dB) to 140kHz (-.5dB)

### Test Conditions:

-10dBu signal at synth input.  
 Input slide fader set at #10 position.  
 Trim control set fully clockwise.  
 Equalizer In/Out switch set to Out.  
 Program master adjusted to indicate 0 VU.  
 Frequency response measured at program feed-left  
 with a high quality AC voltmeter.

## Specifications (Cont.)

Residual Noise Measurement  
(Synth In to Program Out)

-82dBu

Test Conditions:

-10dBu signal at synth input.  
Input slide fader set to #10 position.  
Pan pot centered.  
Adjust program master to indicate 0VU (+4dBm)  
at program feed jack-left.  
Input signal removed and terminated with 10k  
ohms.  
Noise measured at program feed-left with a  
unweighted filter.

Low Band Equalization	50Hz-500Hz, 15dB Boost or Cut
Mid Band Equalization	500Hz-5kHz, 15dB Boost or Cut
High Band Equalization	5kHz-15kHz, 15dB Boost or Cut

Power requirements (Mixer)	Bi-polar 16.5 volts DC, 1.3 Amp
Power requirements (Power Supply)	120 VAC, 1.0 Amp

Dimensions - SSM Main Unit	HxWxD = 15.75" x 19" x 4.25" (400mm x 483mm x 108mm)
Dimensions - SSM Expander	HxWxD = 15.75" x 19" x 4.25" (400mm x 483mm x 108mm)
Dimensions - Power Supply	HxWxD = 3.75" x 11.25" x 5.25" 95mm x 286mm x 133mm)

Shipping weight - SSM Main Unit	Approximately 32 lbs (14.4Kg)
Shipping weight - SSM Expander	Approximately 30 lbs (13.5Kg)
Shipping weight - Power Supply	Approximately 10 lbs (4.5 Kg)

# Initial

## Unpacking and Inspection

The Model SSM is delivered in a special, protective container and was carefully inspected both mechanically and electrically before shipment. It should be physically free of marks and scratches and in perfect electrical order upon receipt. To confirm this, the product should be inspected for physical damage that may have occurred in transit. Any damage should be reported to your dealer and delivery company as soon as possible.

## Environmental Considerations

The Model SSM will operate satisfactorily over a wide range of ambient temperatures, and the power supply will operate from 10 to 50 degrees C. If the power supply is installed in an equipment rack that also contains heat producing equipment such as power amplifiers or other power supplies, adequate ventilation should be provided. This will prolong component life and maximize operational stability.

While the internal circuitry of the SSM is fully shielded by the steel chassis, installation should nevertheless be planned to avoid locating the SSM, optional SSM Expander, or any low level audio equipment immediately adjacent to power amplifiers, power supplies, or any source of Electromagnetic emissions.

## Grounding

To protect operating personnel, the National Electrical Manufacturers Association (NEMA) recommends that the instrument panel and rack cabinet be grounded. All Speck power supplies are equipped with a three conductor power cord which, when plugged into an appropriate receptacle, grounds the power supply. The offset pin on the power cord's three-prong plug is the ground wire.

The three conductor line cord and plug assembly is wired in accordance with NEMA convention (line - black, Neutral - white, and safety earth - green). Audio signal grounds and DC grounds from the mixer are isolated from the AC safety earth.

When using the Model SSM and its power supply outside North America, it will be necessary to adapt a different power plug for that specific country.

## CAUTION!

DO NOT REMOVE, DEFEAT, OR DISABLE THE SAFETY EARTH TERMINAL ON THE POWER CORD. DO NOT USE A GROUND LIFT ON THE POWER SUPPLY.

**Rack grounding**

Merely affixing the Model SSM or optional SSM Expander into an equipment rack is no guarantee that the product is making a reliable ground connection. The mounting rails in the equipment rack should never be depended upon for a ground connection.

**Repacking For Shipment**

The following information is provided as a general guide for repackaging your Model SSM for shipment. If you have any questions, contact your local Speck Dealer or Speck Electronics direct. Our phone number is (760) 723-4281.

If the product is to be shipped to Speck Electronics for service or repair, attach a tag to the product, identifying the owner and indicating the service or repair to be accomplished. Include the model number and serial number of the product. Place the product in the original container if available. If the original container is not available, a suitable one can be purchased from Speck Electronics.

If the original container is not used, wrap the product in heavy plastic before placing in an inner container. Use plenty of packing material around all sides of the product and protect panel faces with cardboard strips. Mark shipping container with "Delicate Instrument" or "Fragile", and insure the shipment for the proper amount.

In most cases, it will be necessary to remove the rack mount adapters if the unit is returned in its original shipping container. When remounting the rack mount adapters, make certain you use the original mounting screws supplied with the Model SSM.



# Installation

## General

The following information should give you the basics on how to install the Model SSM Main Unit, optional SSM Expander, and Model PS3 Power Supply. The proper installation of the SSM as a part of a larger system requires a clear understanding of audio wiring, AC distribution, grounding, and shielding techniques.

When the Model SSM is being installed into a larger system it may be necessary to retain the services of someone experienced in these matters.

Before the mixer may be placed into its normal operating position, it will be necessary to install the appropriate rack mount adapters.

## Mechanical Installation

The Model SSM may be installed in the vertical position using the standard 19" rack mount adapters or may be mounted in a horizontal (flat) position using the optional slide/tilt rack sliders. The mixer may be installed into any 19" wide equipment rack that uses standard E.I.A. universal spacing. The SSM and optional Expander may be affixed to standard E.I.A. rack rails using (8) 10-32 machine screws.

The location of the SSM and Expander should be such that the operator has a clear, unobstructed view of the front panels from his normal operating position. The unit should also be within easy reach of the operators normal position in order to facilitate the use of the front panel controls.

## Physical Placement of Adjacent Equipment

Any device that emits a high EMI (Electro Magnetic Interference) or RFI (Radio Frequency Interference) energy field should be treated with suspicion. EMI is considered any unwanted signal which adversely affects the operation of the mixer or the mixing system. This subject is discussed in Chapter 5.

Electronic equipment such as power amplifiers, power supplies (especially wall mount type), video monitors, computers, certain synths and samplers must be located away from the SSM Main Unit, the SSM Expander, Assign 28, and their associated cables. It may be necessary to alter the positions of certain equipment that you feel would cause buzzes or hums in the mixer system.

## Power Supply

The Model SSM is supplied with the Model PS3-1.5 power supply that offers a variety of mounting options. The power supply may be placed on any flat surface, permanently affixed to a flat surface, or mounted on a single rack rail with the optional rack mount adapter.

One of the primary reasons that the power supply of the SSM is external is to insure that the power transformer enclosed within the power supply chassis maintains a safe distance from the active electronics of the SSM and the Expander. For that matter, any power supply (especially the small wall mount supplies), power amplifiers, or any strong power field device should be kept at a reasonable distance from the SSM and Expander. It is also important to keep the above mentioned devices clear of all interface cables, audio cables and harnesses.

The external power supply for the SSM does not provide an AC power switch. It is recommended the power supply be plugged into an AC strip that uses a power switch.

## Mounting location

The power supply should not be installed directly above or below the mixers. It is recommended that it be installed in the rear of the equipment rack, providing that it remains at a reasonable distance from the mixers and cables, and has adequate ventilation.

The power supply normally generates a small amount of heat during operation. It is important that adequate ventilation is provided when planning the mounting location.

## Configuring the AC

The power supply may be wired to operate with 120 VAC, 220 VAC, 230 VAC, or 240 VAC 50/60hz. Before applying AC power, you should verify that the voltage setting on your power supply is configured to match the AC requirements of your country. This procedure should be performed and checked by a qualified technician.

Unless otherwise specified on the panel of the supply, the power supply is wired for 120 VAC 50/60Hz operation and uses a North American style AC plug.

To gain access to the inside of the power supply, it will be necessary to remove the top cover. This is accomplished by removing the 4 screws on the bottom of the power supply chassis. **Make certain that the power supply is unplugged from the AC before proceeding.**

There are five terminals available on the power transformer of the power supply. The configuration of the five terminals determines the operating voltage of the power supply. It is only necessary to change the black (line) and white (neutral) AC wires. Do not attempt to remove or change the Green AC safety wire or the multicolored wires used at the DC terminals. It is recommended that you measure the DC voltages at the circular DC connector before reconnection to the mixer.

### AC wiring chart

The following chart represents the proper AC terminal configuration for the Model PS3-1.5 power supply.

<u>FOR USE AT:</u>	<u>120 VAC</u>	<u>220 VAC</u>	<u>230 VAC</u>	<u>240 VAC</u>
JUMPER AT:	1 & 3 2 & 4	2 & 3	2 & 3	2 & 3
APPLY AC AT:	4 & 1	1 & 5	4 & 1	4 & 1

### Fuse chart

The following chart represents the proper fuse rating for the Model PS3-1.5 power supply. All fuses are 3AG Slow-Blow type.

120 VOLTS AC	1 AMP
220 VOLTS AC	.5 AMP
230 VOLTS AC	.5 AMP
240 VOLTS AC	.5 AMP

### CAUTION!

ALWAYS CHECK THE PROPER OPERATING VOLTAGE BEFORE OPERATING THE SSM.

### CAUTION!

DO NOT REMOVE, DEFEAT, OR DISABLE THE SAFETY EARTH TERMINAL ON THE POWER CORD. DO NOT USE A GROUND LIFT ON THE POWER SUPPLY.

## Connecting the Power Supply

Before connecting the circular DC power supply connector to the SSM, make certain the power supply is not plugged in.

To connect the power supply to the main mixer, fit the circular connector from the DC power supply cable to the circular chassis mount receptacle mounted at the rear of the Model SSM. The respective connectors are keyed so the plug and chassis mount receptacle can fit in only one direction. When the connectors have been mated, rotate the circular lock clockwise until it stops.

### Power supply DC pin-outs

The following chart represents the DC voltages available at the 9 pin circular connector on the Model PS3 power supply.

PIN 1 - DC COMMON (AUDIO)  
PIN 2 - MINUS 16.25 VDC (AUDIO)  
PIN 3 -  
PIN 4 -  
PIN 5 -  
PIN 6 - PLUS 16.25 VDC (AUDIO)  
PIN 7 -  
PIN 8 -  
PIN 9 -

### Ground Terminal

A grounding terminal is provided just below the circular power supply receptacle on the SSM main unit, and immediately to the left of the interface connector on the SSM expander.

The grounding terminal should be used when it is necessary to connect the SSM and Expander to a qualified ground. This ground terminal should not be relied upon as a source of ground for other electronic equipment. The ground terminal must not be used as a substitute for the power supplies AC grounding conductor.

## Rack Mount Adapters

In order to install the SSM in a 19" equipment rack, it will be necessary to attach the two rack mount adapters to the main chassis of the SSM and optional Expander. Each rack mount adapter is attached to the main chassis of the mixer with four 6-32 x 3/16" Phillips machine screws.

### Installation

Using a Phillips screwdriver, remove the eight screws installed on both sides of the mixer. Position the adapters so the side with the small round holes match the threaded holes on the sides of the SSM, and the side with the oval shaped holes are towards the front panel of the mixer.

Attach the rack mount adapters to the left and right sides of the chassis with the eight screws and tighten.

### Optional Slide/Tilt Rack Adapters

In order to install the optional slide/tilt adapters it will be necessary to remove the standard rack mount adapters. The slide/tilt adapters are available in many sizes and mounting configurations depending on the dimensions and style of your equipment rack. Please contact your dealer or Speck Electronics for specific details on the ordering and installation of the rack sliders.

#### **IMPORTANT!**

ONLY USE THE SHORT SCREWS THAT ARE SUPPLIED WITH THE MIXER. USING LONGER SCREWS WILL DAMAGE THE INTERNAL CIRCUITRY OF THE MIXER.

### Default Control Settings

Before any attempt is made to operate the mixer, it would be a good idea to set all the mixer's controls to their neutral positions. This gives you a reference point to work from when adjusting controls and switches.

All volume controls such as effects sends, effects returns, and master level controls should be set to their full counter-clockwise setting. All pan controls and equalizer Boost/Cut controls should be set centered. All pushbutton switches on the front and rear panel should be set to the out position, and the three toggle switches at the rear should be set in the up position.

When any future reference is made to the controls or switches of the Model SSM, it will be assumed that they have been set to their neutral positions.

### Cleaning

The front and rear panels are a high quality painted surface and the panel lettering is applied using a silkscreen printing technique.

To clean the front or rear panel, wipe the surface gently using a soft lint-free cloth to avoid scratching the panel or markings. Paper towels are not recommended. Commercially available window cleaner solutions may be used; however, the solution should be applied to the cloth and not the panel to avoid the seepage of liquid to the inside of the enclosure.

#### **IMPORTANT!**

DO NOT USE BRUSHES OR FEATHER DUSTERS TO REMOVE DUST. THIS MAY CAUSE DUST TO FALL INTO THE OPENINGS AROUND THE PUSHBUTTON SWITCHES.

## Interfacing Expanders

The Model SSM has been prewired with a multipin pin connector to accept any of the SSM series of Expanders. SSM Expanders are available in two versions: The SSME-X-32, 16 stereo channels; and the SSME-X-16, 16 mono channels.

The Expander is connected to the main mixer with a special 6 foot shielded multiconductor interface cable that utilizes 38 pin Elco connectors at each end. The Expander does not require an additional power supply, as it receives its power when connected to the main mixer.

### Mounting location

The Expander is considered an extension of the main mixer and is not intended to be remotely mounted. It was designed to be installed directly above or below the main unit and should follow the same installation guidelines as described for the main unit.

Due to the mounting proximity requirements of the Expander, the length of the interface cable has been limited to 6 feet. No attempt should be made to modify or extend this cable. Any attempt to modify or extend this cable could result in extreme noise, oscillation, hum or buzzes, or total failure of the Model SSM.

### Installing the Interface Cable

Before connecting the SSM Expander to the SSM main unit it is important that the power supply be turned off.

To attach the interface cable, gently fit the 38 pin Elco connector into the main mixers receptacle and turn the actuator screw clockwise. The connector and receptacle are keyed so they can only fit in one direction. If any resistance is met when installing the connector, reverse the actuator screw, remove the connector, inspect for any obstruction and try again. Install the other connector end into the Expander in the same manner.

If there is an excess amount of interface cable remaining after the units have been connected, it should be bundled neatly with a cable tie. It is important that the interface cable be kept away from sources of EMI and RFI. These EMI sources include power supplies, power amplifiers, or any power creating device that could cause undesirable buzzes or hums in the mixer system.

**Expander pin assignment**

The following chart represents the audio and power connections available at the 38 pin interface connector at the rear of the SSM.

PIN A - COMMON	PIN T - EFFECT SEND 7
PIN B - PLUS 16.25 VDC	PIN U - EFFECT SEND 8
PIN C - MINUS 16.25 VDC	PIN JJ - PFL SIGNAL
PIN L - EFFECT SEND 1	PIN KK - PFL SENSE
PIN M - EFFECT SEND 2	PIN LL - SOLO SENSE
PIN N - EFFECT SEND 3	PIN MM - SOLO SIGNAL-LEFT
PIN P - EFFECT SEND 4	PIN NN - SOLO SIGNAL-RIGHT
PIN R - EFFECT SEND 5	PIN PP - PROGRAM-RIGHT
PIN S - EFFECT SEND 6	PIN RR - PROGRAM-LEFT

**Interfacing the Assign 28**

The Assign 28 is a self contained, 8 output assign/subgroup module designed to operate in conjunction with the Model SSM and SSM Expander. The Assign 28 receives its signals from the 1/4" direct output jacks at the rear of the SSM and SSM Expander. There are no special requirements for installation and interface to the Assign 28 except to use reasonable care in the layout of the audio cables.

**Mounting location**

It is recommended that the Assign 28 be installed directly above or below the Model SSM. This will keep the cable lengths short, thereby reducing the susceptibility to hums and buzzes caused by EMI emissions.

**Connecting the Assign 28**

A 1/4" T.S. (tip, sleeve) to 1/4" T.S. cable is required for each "direct out" to "assign in" connection. If your mixer has 24 direct outputs (12 stereo pairs), this would require 24 cables for connection to the Assign 28.

The Assign 28 also provides 8 stereo effects returns that may be interconnected to the 8 effects returns of the Model SSM. This would require 16 cables. It is recommended that multipair harnesses be used in lieu of numerous single cables.

For more complete installation details, refer to the documentation that is supplied with the Assign 28.

**Expression Pedal**

If you have decided to use the expression pedal feature on the SSM, it will be necessary to connect the cable and pedal to the system.

**Connecting the Cable**

The optional interface cable is wired with a 6 pin DIN connector on one end and four 1/4" plugs on the other end. The 6 pin DIN connector must be plugged into the female expression pedal connector located at the rear of the SSM. The four 1/4" phone plugs will be inserted into the corresponding jacks on any standard passive stereo volume pedal.

**Expression Pedal Enable Switch**

The Expression Pedal Enable Switch on the front panel of the main mixer must be depressed in order to operate the volume pedal.

**Pedal Connector Pin**

The following chart represents the audio connections available at the 6 pin DIN connector at the rear of the SSM main unit.

PIN 1 - INSERT OUT-RIGHT
PIN 2 - INSERT OUT-LEFT
PIN 3 - COMMON
PIN 4 - INSERT IN-LEFT
PIN 5 - COMMON
PIN 6 - INSERT IN-RIGHT



# Operation

## General

We hope to give you basic information on the operation of the Model SSM and adequately describe its controls, switches, and connectors.

It is assumed that you have a working knowledge of audio and signal flow. If this is your first mixer it is suggested that you purchase a book on the basic operation of audio mixers. Speck Electronics or your dealer will be happy to suggest some publications on this subject.

## FRONT PANEL CONTROLS

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### Input Channel

The Model SSM may be configured with either mono or stereo input channels. The stereo channel will accept any stereo synth signal and all controls and switches in the signal path will simultaneously adjust the parameters of the left and right signals. The mono input channel accepts a single (mono) synth signal, and all controls and switches are designed to adjust that signal in a conventional manner.

The stereo input channels are identified with a black slide fader knob and a yellow LED adjacent to the P-M pushbutton switch. The Mono input channels are identified with a grey slide fader knob and a red LED adjacent to the P-M pushbutton switch.

The following input channel descriptions are for a stereo input channel but generally apply to a mono input channel unless otherwise noted.

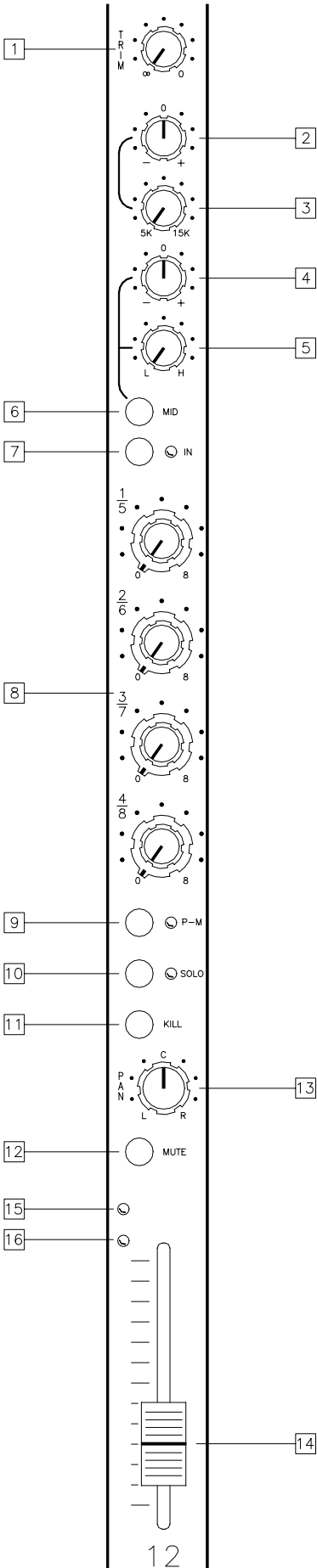


Figure 3. Input Channel

Refer to Figure 3 for location of items 1 thru 16.

### **1. Synth Trim Control**

The dual Synth Trim Control simultaneously adjusts the gain (level) of the left and right channel inputs. Its normal operating or starting position is when set fully counterclockwise. In order to help maintain the extremely high frequency response and low noise characteristics of the Model SSM, utilize this control only as needed.

If an individual synth or sampler proves too weak, it is good practice to add level by first pushing up the channel's slide fader if possible, or by making sure that the synth or sampler plugged into that channel is set to its maximum output. Should these adjustments fall short, then turn the Synth Trim Control clockwise until the required mixing level is obtained. Repeat this procedure each time a new patch, or sample is chosen.

## **Equalizer Section**

The equalization section has two independent signal paths and utilize dual pots that simultaneously adjust the left and right parameters of the equalizer.

The equalizer for the SSM is a semi-parametric type, whereas the Frequency Sweep Control adjusts one of the parameters, and the Boost/Cut Control adjusts the second of the parameters. The third possible parameter available on a parametric equalizer would be the frequency bandwidth adjustment. The bandwidth (Q) for the low, mid, and high bands on the SSM equalizer are fixed at approximately 12db/octave.

### **2. High Boost/Cut Control**

This control provides 15db of bell shaped Boost or Cut for the high frequency range (5K to 15Khz), and is used in conjunction with the High Frequency Sweep Control (see below). 0db boost/cut (flat) is obtained when this control is set to its center position.

### **3. High Frequency Sweep Control**

The High Frequency Sweep Control is used in conjunction with the High Boost/Cut Control and provides continuous adjustment from 5Khz (fully counterclockwise) to 15Khz (fully clockwise).

### **4. Low and Mid Boost/Cut Control**

This control provides 15db of bell shaped Boost or Cut in either the low band (50 to 500hz) or mid band (500hz to 5khz) frequency ranges dependent on the position of the Low/Mid Band Select Switch (see below). This control is used in conjunction with the Low/Mid Sweep Control. 0db boost/cut (flat) is obtained when this control is set to its center position.

**5. Low and Mid Frequency Sweep Control**

The Low/Mid Frequency Sweep Control is used in conjunction with the Low/Mid - Boost/Cut Control and provides continuous adjustment from 50hz (fully counterclockwise) to 500hz (fully clockwise) when the Low/Mid Band Select Switch (see below) is in the Low position. This control provides continuous adjustment from 500hz (fully counterclockwise) to 5Khz (fully clockwise) when the Low/Mid Band Select Switch is in the Mid position.

**6. Low/Mid Select Switch**

This switch determines the frequency range affected by both the Low/Mid - Boost/Cut control and the Sweep control. The up position selects the low (50 to 500hz) range while the down position selects the mid (500hz to 5khz) range.

**7. Equalizer In/Out Switch**

In the up position the equalizer section is totally bypassed. When this switch is depressed, the equalizer is inserted in the channels audio path.

The green LED to the right of this switch illuminates indicating that the equalizer is enabled.

**8. Effects Sends 1 thru 8**

Eight discrete effect sends are configured as four dual concentric potentiometers. The center (smaller) knobs are numbered 1 thru 4 (top to bottom) and the outer (larger) knobs are numbered 5 thru 8 (top to bottom).

Each stereo channel also incorporates an effects Sum/Split switch (located at the rear). When this switch is in the Sum position, the source for effects sends 1 thru 8 is the algebraic sum of the left and right synth signals, post (after) the input level control. When the Sum/Split switch is in the split position, the source for effects sends 1 thru 4 is the left synth signal, and the source for effects sends 5 thru 8 is the right synth signal.

The effects sends may be operated in the pre mode with the operation of the Kill switch.

**9. P-M Switch**

The P-M switch has two designations. "P" is the designation for the pre fader listen (PFL) switch, and is found only on mono input channels. "M" is the designation for the Stereo/Mono switch, and is found only on stereo input channels.

**Stereo/Mono Select Switch**

On the stereo channel, this switch acts as the Stereo/Mono select. When depressed, this switch sums the left and right inputs together, creating a mono composite. When the channel is in the mono mode, the Pan/Balance Control is then used for traditional left to right panning of the mono (mono composite) synth signal.

A yellow LED to the right of this switch will illuminate indicating the Mono status of operation.

#### **Pre Fader Listen (PFL) Switch**

When the Model SSM is configured with mono input channels, this switch acts as a Pre Fader Listen (PFL) Switch. Depressing this button allows the selected channel's signal to be soloed (in mono) even if the slide fader is down or the channel is muted.

The source for the PFL signal is post (after) the equalizer circuit so any EQ changes will be reflected. As with the in-place solo circuit, PFL feeds only the master monitor and/or headphone outputs as well as the dedicated tuner output.

A red LED to the right of this switch, as well as the master Solo/PFL LED will illuminate indicating its status.

#### **10. In-Place Solo Switch**

Depressing this switch allows you to isolate any input channel to the monitor and/or headphone outputs while maintaining stereo perspective. This means that the Pan/Balance Control remains active, and any left/right position set by the Pan/Balance Control to the stereo mix will be maintained when the In-Place Solo Switch is depressed. The direct outputs on each input channel also remain unaffected by the operation of the solo switch.

The source of the solo signal is post (after) the channels equalization and the slide fader control. When a solo switch is enabled, any adjustment to the channels level control or equalization will be evident in the monitor and/or headphone playback.

Any combination of input channels or effects returns may be soloed without interrupting the flow of the signal to the program master feed.

A red LED to the right of this switch as well as the master Solo/PFL indicator will illuminate if a channel is soloed.

#### **11. Kill Switch**

Depressing this switch deletes only the channels dry signal from the SSM's stereo mix but leaves the rest of the channels signal flow (equalizer, effects sends, and direct outputs) intact. This allows you to send a synth or sampler signal to any number of effects devices without hearing the original signal.

Unlike traditional pre-fader modes, here the sends are still post fader. So if, for example, you create a delicately balanced multi effects only patch, changing its overall level is simply a matter of adjusting the channel fader and not the individual effect sends. Layering one synths effects over another synths dry sound is one other way of creatively utilizing this function.

Because the direct outputs are post fader, it is also possible to extract an individual channel from the SSM by enabling its associated Program Kill Switch and accessing the channels direct outputs.

#### **12. All Mute Switch**

Unlike the Program Kill Switch, depressing this button eliminates all signal flow to its respective channels direct output, left/right program mix, as well as the effect sends. The PFL switch on mono input channel is unaffected by the operation of the Mute Switch. Any signal present at the channels patch point (if that channel is so equipped) remains unaffected by the operation of the Mute Switch.

#### **13. Input Pan/Balance Control**

When a stereo source is being used, this control acts as a balance for the left and right inputs. The left to right movement of this control will adjust the respective volumes of the left and right synth signals. If the channels Mono Switch is enabled, this control acts like a traditional pan pot, placing the mono signal anywhere in the stereo left/right perspective.

#### **14. Input Level Control**

The stereo input channel employs a dual linear motion slide potentiometer that simultaneously and equally adjusts both the left and right signals. A good starting position for this slide fader is to align the slider knob to the #10 mark on the panel. Due to the SSM's unique gain structure, it is perfectly acceptable to set the fader higher if needed (see Synth Trim Control).

The operation of the slide fader will control the level to the stereo program mix, the eight effects sends, and the direct outputs.

#### **15. Maximum Output LED**

This red LED will only activate when the channels synth preamplifier is near its maximum output. If the LED does illuminate, it's possible that the Synth Trim Control has been increased higher than required for the audio signal plugged into its respective channel. The solution is to reduce gain at the Synth Trim Control until you are certain the LED will not illuminate. If necessary, increase the channel slide fader to compensate for the loss of volume.

#### **16. Presence of Signal LED**

This green LED will illuminate when a signal is present at the left or right channel. This provides for easy identification of an active synth even when a channel is muted and sound is inaudible.

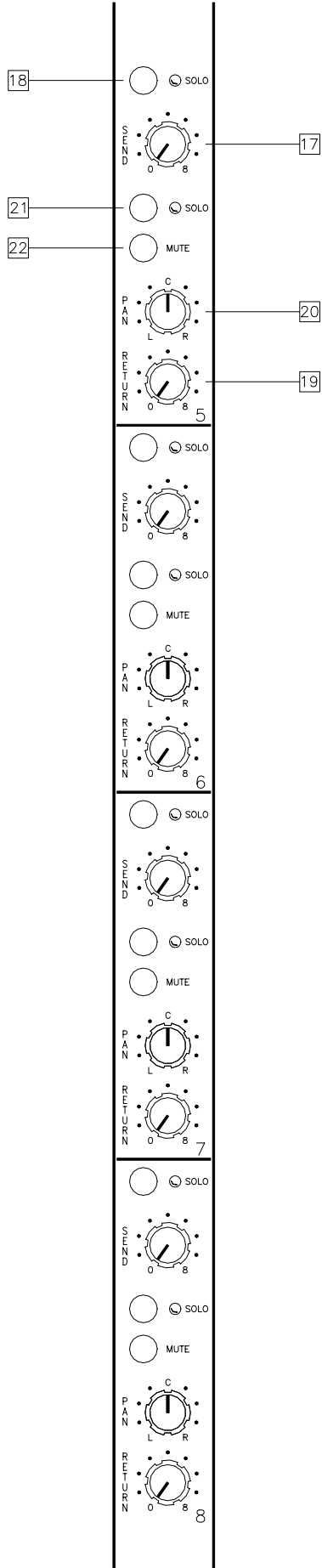


Figure 4. Effects Send and Return Channel

*Refer to Figure 4 for location of items 17 thru 22.*

## **Effects Send and Return Section**

### **17. Effects Send Master Control**

There are eight effect send and return sections incorporated into the Model SSM. Each section provides a master level control and solo for the effect sends. The eight stereo effects returns include a master return level control, in-place solo switch, and mute switch.

This potentiometer adjusts the overall send output level (to the outboard effects device itself) of all channel signals routed to the Effect Send Master via its associated channel Effect Send Controls. When matched with an effects unit that is operated at a professional input level of +4dbm, the optimum setting for this pot is typically anywhere from two to three o'clock.

### **18. Effects Send Master Solo Switch**

Depressing this button will provide a mono solo of all channel signals routed to an Effects Send Master via its associated channel Effect Send Controls. This can help determine if there is indeed signal present at a given effect send master output and establish the relative balance of multiple channels signals routed to a given effect send master.

### **19. Stereo Effects Return Level**

This dual pot simultaneously and equally adjusts the left and right effects return level. With the Effects Return Group Master (see Master Section) set fully clockwise, a setting of approximately two to three o'clock could yield an adequate level of effect when matched with an effects unit that is properly operated at a professional input/output level of +4dbm.

### **20. Effects Return Pan Control**

This control acts as the left/right balance for any stereo output effects device connected to an effects return. When a mono output effects device is connected to the effects return, then this control would act as a traditional pan.

### **21. Effects Return Solo Switch**

Depressing this switch allows you to isolate any effect return to the monitor and/or headphone outputs while maintaining stereo perspective. The source for the in-place solo circuit is post (after) the Effects Return Level Control. This allows you to solo multiple effects returns while retaining their relative levels.

Any combination of effects returns, or input channels may be soloed without interrupting the flow of the signal to the program master. A red LED to the right of this switch as well as the master Solo/PFL LED will illuminate when the return is soloed.

### **22. Effects Return Mute Switch**

This switch eliminates an individual effect return from the master program and monitor outputs as well as the headphone circuits.



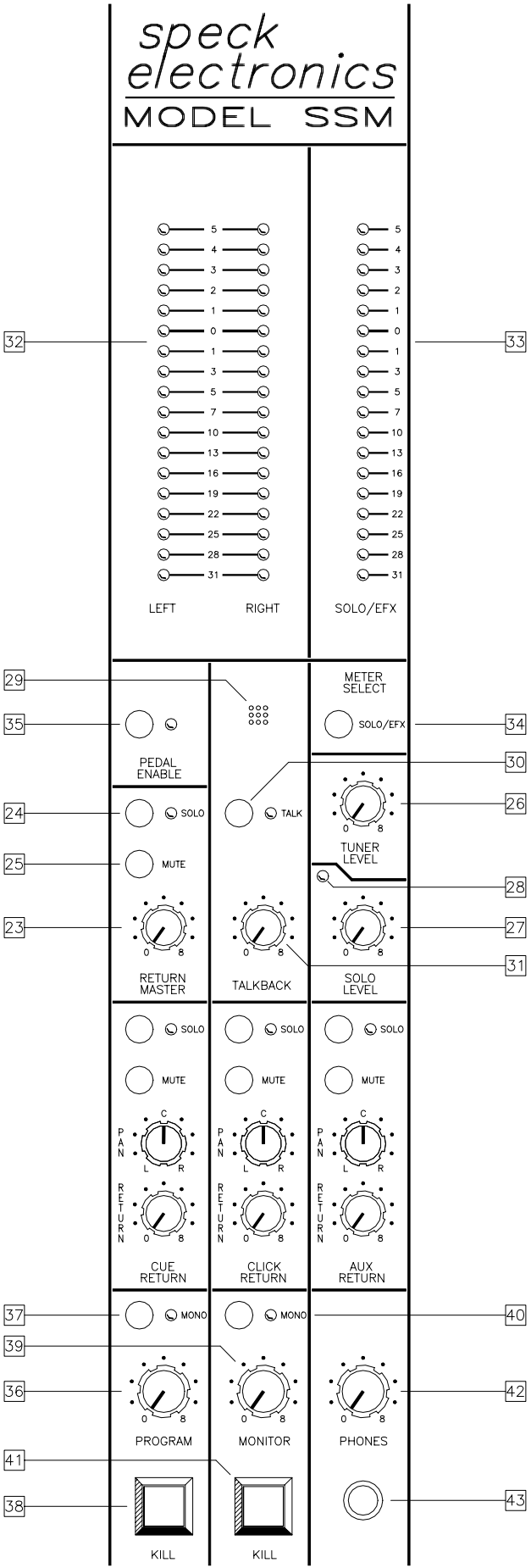


Figure 5. Master Section

## Master Section

*Refer to Figure 5 for location of items 23 thru 43.*

### 23. Effects Return Group Master Control

This control acts as a master level adjustment for all eight stereo effects returns and is normally set to its fully clockwise position.

In reality, there is no additional level available in the effects return signal path. Unity gain, meaning no level lost or added, is obtained when the Group Master Control is set to its fully clockwise position.

If the effects devices being utilized with the SSM are properly operated at a professional input/output level of +4dbm, it would be acceptable to adjust this control to the three o'clock mark. This will afford an additional overall effects level boost when needed. Otherwise, set the Effects Return Master Level Control to its fully clockwise position and forget it.

### 24. Effects Return Group Solo Switch

The Effects Return Group Solo Switch permits an instantaneous In-place solo of all eight stereo effects returns.

At times it is convenient to be able to listen to all of the effects returns at once. This can be particularly useful if you are creating multi-effects only patches.

As with all the solos on the SSM, only the monitor and/or headphone outputs are affected. Effects returns may be individually muted or unmuted even if the Group Master Solo is activated.

### 25. Effects Return Group Mute Switch

This is a convenient master mute function for all eight stereo effects returns. When the Group Mute is activated, the Effects Return Group Solo is unavailable. However, any individual effect return may be soloed even if the Effects Group Mute is depressed.

### 26. Tuner Level Control

This control adjusts the output volume to a dedicated tuning device (see rear panel). The source for this output is either the sum of all signals feeding the program master or any in-place solo or PFL signals.

If, for example, you need to tune only one synth module while others are active, simply depress its associated solo or PFL switch and it will be isolated to the tuner output.

There is ample gain available at this output so that even the softest synth patches will trigger the tuners circuitry. Start by positioning the control at the twelve o'clock mark, and adjust if necessary.

- 27. Solo Master Level Control** This control adjusts the overall stereo in-place solo listening level to the monitor and/or headphone outputs (see the Solo to Monitor Switch, rear panel section). The adjustment of this control permits the volume of a soloed signal to match the level of the normal stereo mix.
- Keep in mind that the monitor and/or headphone output level controls still function even when the solo output is activated.
- 28. Master Solo/PFL LED** This LED illuminates when any solo or PFL switch is depressed.
- 29. Talkback Mic** The talkback section of the SSM incorporates an internal omnidirectional microphone. This sensitive microphone will operate most efficiently when the operator speaks at a distance of about two feet from the mike. This mic is activated by the Talkback Switch and is adjusted with the Talkback Level Control.
- 30. Talkback Switch** This momentary switch activates the talkback circuit for control room or house mix communication. When this circuit is activated, it effectively interrupts the stereo program mix, and allows talkback to the stereo program 1/4" and XL outputs. The signal to the stereo monitor feed is muted when the Talkback Switch is enabled.
- 31. Talkback Level Control** This control adjusts the volume of the talkback circuit to the program output. The suggested setting for this control is approximately the two o'clock range and adjust as necessary.
- 32. Left/Right VU Displays** These 18 segment VU (volume units) meters indicate the relative levels of the stereo program feed and are sensitive from -31db to +5db.
- Depending on the position of the rear panel Meter Sensitivity Switch (see rear panel), a meter reading of 0VU reflects a mixer output level of either +4dbm, the industry professional standard, or -18dbm. The latter is sufficiently low enough to allow the SSM to be plugged into an external consoles synth or mike inputs. This circuit was designed to approximate the ballistics of a "taut band" analog style VU meter.
- 33. Solo/Efx VU display** These 18 segment VU (volume units) meters indicate the relative levels of the solo/PFL signals or the effects send signals, and are sensitive from -31db to +5db.

The status of this VU meter is determined by the selection of the Solo/Efx Meter Switch. When the Solo/Efx Meter Switch is in the normal position (up) the VU indicates the overall stereo mix of the Model SSM until any solo or PFL switch is depressed. When any solo or PFL switch is depressed, this VU meter displays that respective signal. When the Solo/Efx Select Switch is depressed, this VU meter displays the sum of all effects send signals.

**34. Solo/Efx Meter  
Select Switch**

This switch determines the source for the Solo/Efx VU display. In the normal position (up) the VU displays any solo or PFL signal; when this switch is depressed, it displays the sum of the effects sends.

**35. Expression Pedal  
Enable Switch**

Depressing this switch will insert a stereo volume pedal (connected at rear) into the master signal path allowing dynamic control of the entire mix. Level changes made by the volume pedal will be reflected in the program, monitor and headphone outputs.

We strongly recommend the use of a passive volume pedal as opposed to an active (powered) device. The reason for this is that the SSM's expression pedal circuit is optimized for a passive pedal which will always afford far better sonic results than its active counterparts. Remember, the moment you insert a powered pedal at this point, you are subjecting your entire mix to its frequency response limitations, inherently greater distortion, higher noise, and significantly lower head room.

**36. Stereo Program  
Master Control**

This pot acts as the master volume to the balanced and unbalanced stereo program feed. It should be pointed out that any adjustment to the Program Master Control will be displayed by the left and right VU meters.

With the Program Meter Sensitivity Switch (see rear panel) set to its +4dbm position, a typical starting point for the program master is the three o'clock position. This setting should make it reasonably easy to achieve a 0VU reading when using multiple synth and sampler patches without having to rely on excessive input trim (see input channel) adjustments. If, however, a 0VU reading is desired when using only one source (a single synth), it is perfectly acceptable to set the Program Master Control higher than the three o'clock position to obtain the necessary output.

The Program Master Control does not affect the monitor level or headphone level.

**37. Program Stereo/Mono Select Switch**

Depressing this switch applies a monaural version of the program mix to the left and right program outputs. This means it is possible to send the control room or house mix a mono feed while retaining stereo operation for a set of personal monitors or the headphone feed.

The monitor and headphone outputs are unaffected by the operation of the Program's Stereo/Mono Select Switch.

**38. Program Kill Switch**

This large white pushbutton switch mutes the master program signals to the 1/4" jacks and XL connectors without affecting the monitor or headphone outputs.

Signal will remain present at the left/right program meters when the Program Kill Switch is depressed. When depressed, this switch illuminates indicating the program signal has been muted.

**39. Stereo Monitor Master Control**

This controls the overall level to the stereo monitor feed and operates independent of the Program Master and Headphone Master. Typically, the monitor outputs would be connected to a stereo power amplifier for purposes of driving a personal monitoring system.

In situations where the Model SSM is interfaced to, for instance, a large frame recording console and solo capability desired, then it is completely acceptable to utilize the solo capable monitor outputs for this purpose. The integrity of this signal is virtually equivalent to that of the program output.

In so far as metering the output is concerned (the program meters follow just the program); as long as the Program Trim (see rear panel) is adjusted fully clockwise, then the monitor and program levels, given the same physical adjustment (2,3,4 o'clock etc.), will be equal. Establishing the monitor output level is simply a matter of matching the program and monitor master controls.

**40. Monitor Stereo/Mono Select Switch**

Depressing this switch applies a monaural version of the program mix to the left and right monitor outputs. This also includes any stereo information that has been applied to the Cue, Click, and Aux return inputs.

The program outputs and headphone outputs are unaffected by the operation of the Monitor's Stereo/Mono Select Switch.

**41. Monitor Kill Switch**

This large red pushbutton switch mutes the master monitor output without affecting the program and headphone outputs. When depressed, this switch illuminates, indicating the monitor signal has been muted.

**42. Stereo Headphone  
Level Control**

This dual potentiometer controls the volume of the stereo headphone circuit. The Headphone Master Control operates the headphones that are plugged into the front and rear headphone jacks, as well as the transmitter feed jack.

The operation of the Headphone Master Control does not affect the operation of the program level or monitor level.

***CAUTION!***

USE CAUTION AS EAR DAMAGING LEVELS ARE MOST CERTAINLY POSSIBLE WITH THIS HEADPHONE CIRCUIT.
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**43. Stereo Headphone Jack**

This standard 1/4" stereo phone jack will operate with any impedance headphones. This jack is identical in operation to the rear jack.

The tip of the stereo jack is the left headphone signal, and the ring of the jack is the right headphone signal.

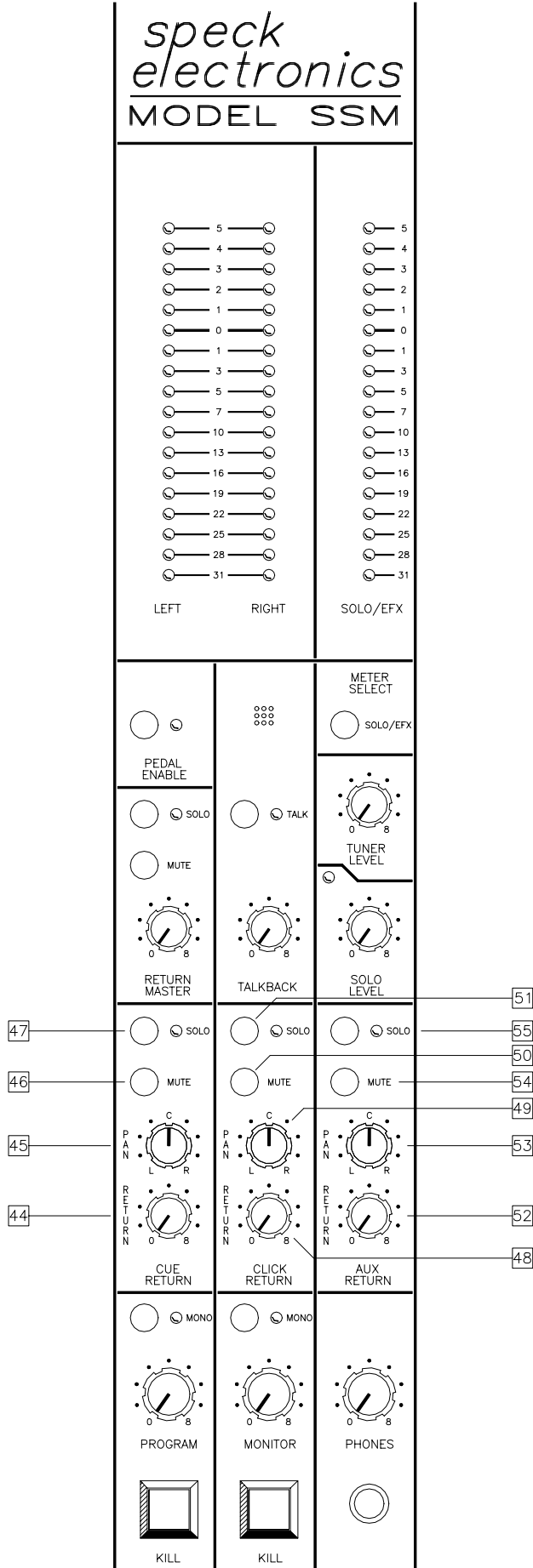


Figure 6. Cue, Click, Aux Return Sections

Refer to Figure 6 for location of items 44 thru 55.

## **Stereo Cue Return Section**

This feature of the SSM allows an external stereo cue source (otherwise known as headphone or foldback) or any stereo line level signal to be integrated into the SSM's monitor and/or headphone feeds. This makes it possible to customize a balance between the SSM's stereo mix and, for instance, the cue feed from a studio control room.

The Cue Return can be accessed via two unbalanced 1/4" phone type jacks or via a transformer isolated XL type connector. For more on these connections, see their rear panel descriptions. Since the source for the Cue signal is most likely the high level output of a power amplifier (via a dedicated headphone box), the input sensitivity of the Cue Return has been adjusted accordingly.

Do not attempt to connect the speaker terminals of any power amplifier directly into the Cue Returns of the SSM.

The stereo Cue Return Section includes the return level control, the Return Pan Control, the return mute switch, and the return in-place solo switch.

### **44. Cue Return Level Control**

The Cue Return Control adjusts the level of an external stereo cue source and returns only to the monitor master and/or the headphone outs.

### **45. Cue Return Pan Control**

This control allows the Cue Return to be panned anywhere in the stereo perspective.

### **46. Cue Mute Switch**

This switch allows muting of the stereo cue return. Enabling this switch removes the stereo cue return signal from the monitor and headphone outputs. The operation of this switch does not affect the operation of the aux or click returns.

### **47. Cue In-Place Solo Switch**

Depressing this switch allows you to isolate the Cue Return to the monitor and/or headphone outputs while maintaining stereo perspective.

## **Mono Click Return Section**

Similar in operation to the Stereo Cue Section, the Click Return is designed to allow an external mono click source (metronome type) or any mono line level signal to be integrated into the SSM's monitor and/or headphone outputs.

The Click Return can be accessed via a single 1/4" phone type jack or via a balanced transformer isolated XL connector. For more on these connections, see their rear panel descriptions.



The Mono Click Return Section includes the return level control, the return pan control, the return mute switch, and the return in-place solo switch.

**48. Click Return Level Control**

The Click Return Level Control adjusts the level of an external Click source or any monaural signal. This signal returns only to the monitor master and headphone outs.

**49. Click Return Pan Control**

This control allows the Click Return to be panned anywhere in the stereo perspective.

**50. Click Mute Switch**

This switch allows muting of the stereo Click Return. Enabling this switch removes the stereo click return signal from the monitor and headphone outputs. The operation of this switch does not affect the operation of the cue or aux returns.

**51. Click In-Place Solo Switch**

Depressing this switch allows you to isolate the Click Return to the monitor and/or headphone outputs while maintaining stereo perspective.

## **Stereo Aux Return Section**

This section allows an external stereo auxiliary source such as a DAT player or the monitor output of Speck's "Assign 28" subgroup module to be routed to the monitor and/or headphone outputs of the SSM.

The Stereo Aux Return Section includes the return level control, the return pan control, the return mute switch, and the return in-place solo switch.

**52. Aux Return Level Control**

The Aux Return Control adjusts the level of an external auxiliary source such as a DAT player or the monitor output of Speck's "Assign 28" assign subgroup module.

**53. Aux Return Pan Control**

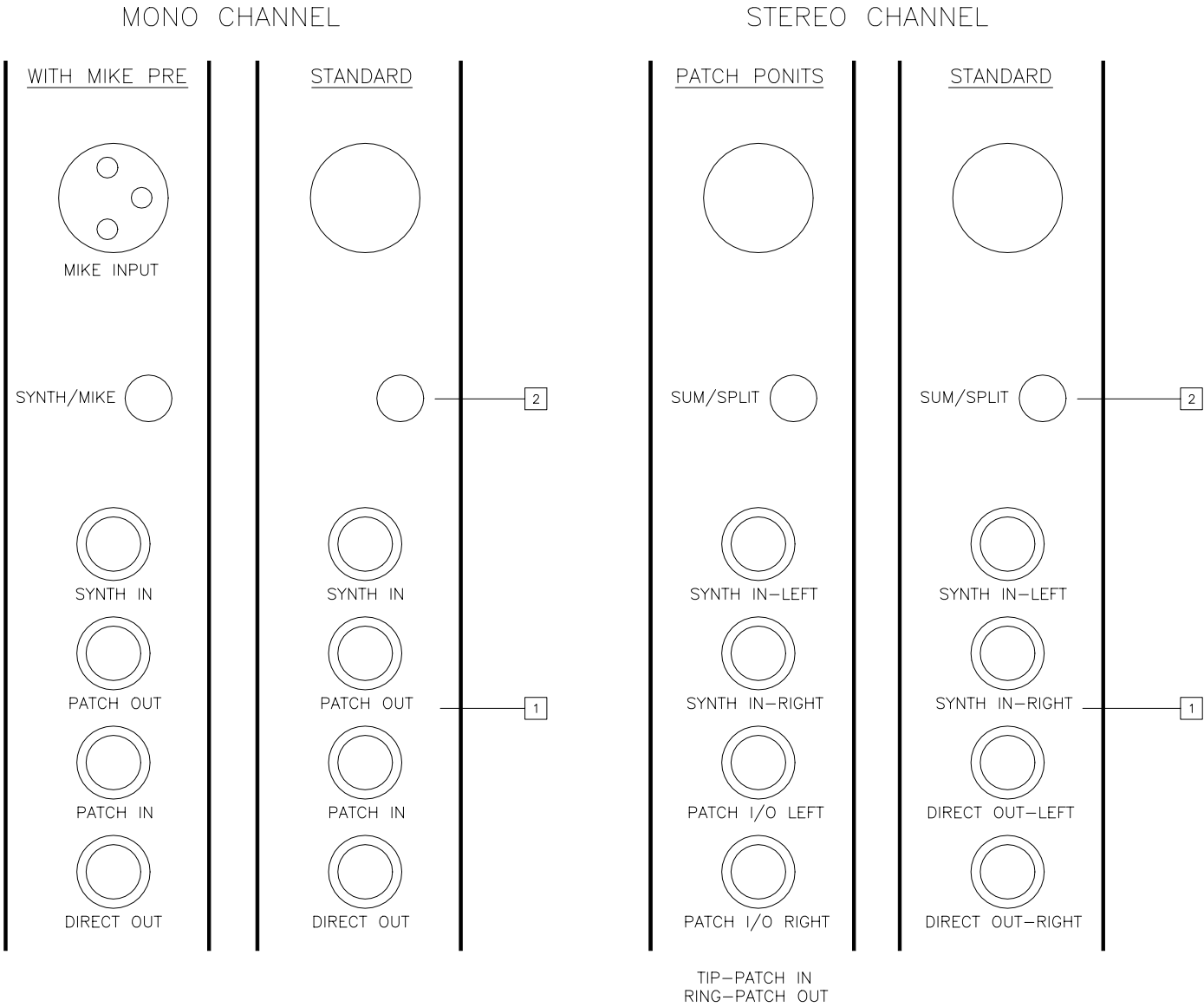
This control allows the Aux return to be panned anywhere in the stereo perspective.

**54. Aux Mute Switch**

This switch allows Muting of the Stereo Aux Return. Enabling this switch removes the stereo aux return signal from the monitor and headphone outputs. The operation of this switch does not affect the operation of the cue or click returns.

**55. Aux In-Place Solo Switch**

Depressing this switch allows you to isolate the Aux Return to the monitor and/or headphone outputs while maintaining stereo perspective.



## REAR PANEL CONTROLS

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### Input Channel Connections and Switches

Refer to Figure 7 for location of items 1 and 2.

#### 1. Input Channel Jacks

Each input channel has four 1/4" jacks. The configuration of these four jacks depend on whether your Model SSM is configured with mono channels, stereo channels or a combination of both.

#### Mono Input Channel Jacks

Each mono input channel has synth input, patch output, patch input, and direct output jacks (from top to bottom). The synth input jack is the primary input connector for most synth/samplers that have a low to medium strength signal (-20dbu to 0dbu). With synth and samplers that have higher strength signals (0dbu to +18dbu), the patch input jack may be used. Using the patch input jack bypasses the synth preamp stage and its synth trim control.

The patch output and patch input jacks provide line level interstage access to the input channel before (pre) the equalizer and slide fader control. This means that any device interfaced to these jacks will be processed after the channels synth preamp and synth trim control, and will not be affected by any adjustments by the equalizer, slide fader, mute switch, or kill switch.

The insert jacks may be used to connect limiters, additional equalization, noise gates, etc.

The direct output jack provides a line level signal for connection to the input of a sampler or multitrack recorder. The direct output also provides an interface to the Speck "Assign 28" subgroup module.

#### Stereo Input Channel Jacks

Stereo channels are configured with balanced left and right line input jacks, and unbalanced left and right direct output jacks (from top to bottom). This is the standard configuration for the stereo input channel. The left and right synth input jacks will accommodate any stereo synth, sampler, or line level signal. The two direct output jacks provide a stereo line level signal to the input of a stereo sampler or the Speck "Assign 28" subgroup module.

**Connections to the balanced left and right inputs should be made with a 1/4" T.R.S. (tip, ring, sleeve) plug. Connections to the unbalanced direct outputs should be made with a 1/4" T.S (tip, sleeve) plug.**

As an option, the stereo input channels may be configured with stereo patch points instead of the direct outputs. When configured with patch points, the four jacks are the left synth input, right synth input, left channel patch In/Out, and right channel patch In/Out (from top to bottom).

Each patch In/Out provides a 1/4" T.R.S. (tip, ring, sleeve) jack. The ring of the jack is the "patch out" signal, the tip is the "patch in" signal, and the sleeve is the signal ground. Consult Speck Electronics or your dealer regarding this option.

## **2. Sum/Split Switch (Synth/Mic )**

This switch has two designations. On the stereo channel this switch selects the Sum or Split mode for the eight effects sends. If an optional mike preamplifier is installed on the mono input channel, this switch selects the Synth or Mic mode of operation.

The Sum/Split Switch is only available on a stereo input channel and is identified with a black pushbutton immediately above the four 1/4" channel jacks. The Synth/Mic Switch and its associated XL mike input connector is only available on a mono input channel and is identified with a grey pushbutton immediately above the four 1/4" jacks.

The absence of any switch in this position indicates a standard mono input channel without a microphone preamp installed.

## **Effects Sum/Split Switch**

Each stereo channel incorporates an effects Sum/Split switch. When this switch is in the Sum (up) position, the source for effects sends 1 thru 8 is the algebraic sum of the left and right synth signals, post (after) the input level control. When the Sum/Split switch is in the Split (down) position, the source for effects sends 1 thru 4 is the left synth signal, and the source for effects sends 5 thru 8 is the right synth signal.

## **Synth/Mic Select Switch**

On a mono input channel, this switch appears only when the channel is outfitted with an optional microphone preamp (indicated by a standard XL type connector). This switch selects between the signal connected at the synth input or the optional transformer mike inputs.

While the synth and microphone inputs can be simultaneously connected, only one is active at any given moment as determined by the position of the Synth/Mic switch. Up for Synth, down for Mic.

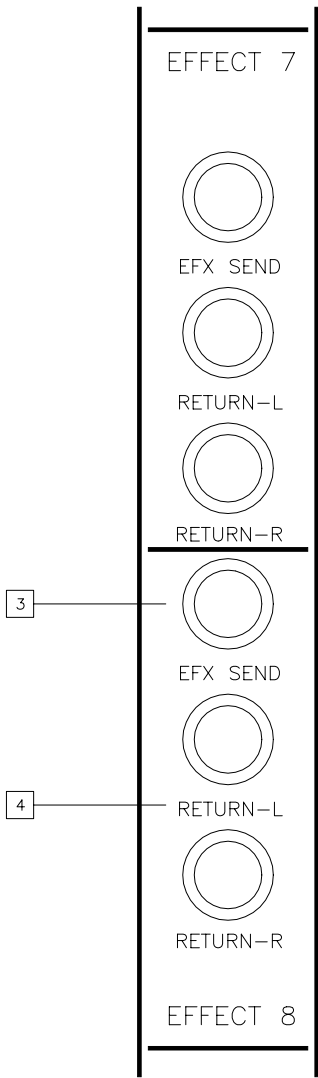


Figure 8. Effects Send and Return Connectors

## Effects Send and Return Connections

Refer to Figure 8 for location of items 3 and 4.

### 3. Effects Send Jack

Each of the eight effect send channels has a separate unbalanced 1/4" T.S. jack to interface to the input of an effects device.

It is completely acceptable, from an electronic standpoint, to adapt this connector to the input of any effects device, regardless of the type of input connector utilized on the effects unit (phone, RCA, XL, barrier strip, etc.).

### 4. Effects Return Input Jacks

Each effects return provides two discrete unbalanced 1/4" T.S. jacks for connection from the outputs of a left/right stereo effects device. In order to operate the stereo effects return as a mono return, it is necessary to connect the mono output of the effect to both the left and right return jacks.

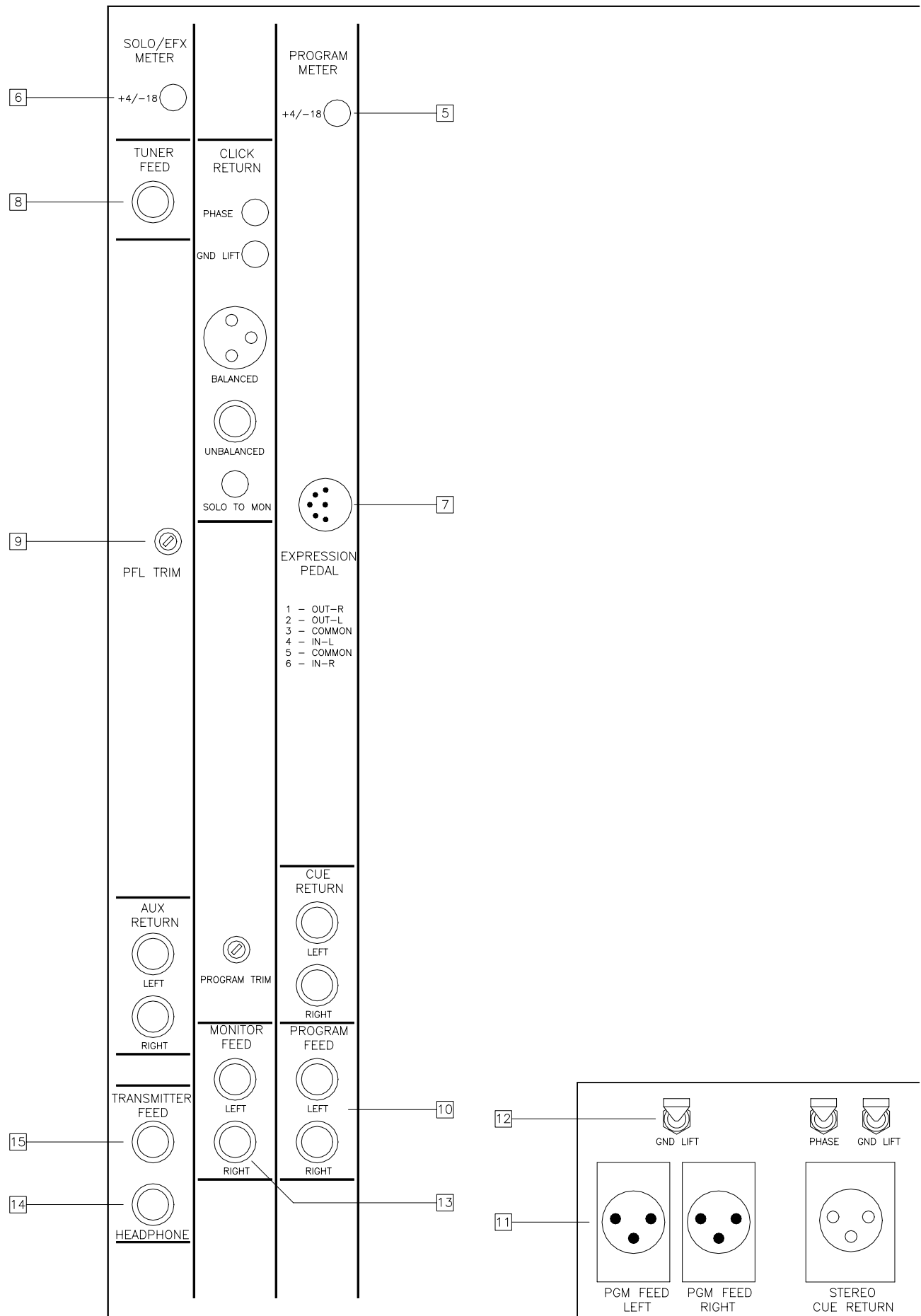


Figure 9. Master Input/Output Connectors

## Master Input/Output Connections

Refer to Figure 9 for location of items 5 thru 15.

### 5. Left/Right Meter Sensitivity Select Switch

This pushbutton switch selects the sensitivity of the left and right Program VU meters; +4dbm operation in the normal (up) position, and -18dbm operation when depressed. The operation of this switch in no way modifies the electronic operation of the mixer.

If the switch is set to its normal (up) position, then a 0VU reading on the meter indicates that a signal value of +4dbm is being yielded at the program output. If the switch is depressed, then the meters become 22db more sensitive, thereby making it necessary, given the same input levels, to turn down the Stereo Program Master Control to once again achieve a 0VU meter reading. However, this same 0VU reading now yields a signal value of -18dbm at the program outputs as a result of the lower Program Master Control setting. This setting should prove sufficiently low enough for the Microphone or Synth inputs of a recording console.

### 6. Solo/Effects Meter Sensitivity Select Switch

As with the Program Meter Sensitivity Switch, this switch selects only the sensitivity of the Solo/Effects VU meter and in no way modifies the electronic operation of the mixer. The same two different operating levels are available; +4dbm or -18dbm.

### 7. Expression Pedal Connector

The 6 pin DIN connector provides a convenient interface to any passive stereo volume pedal via an optional interface cable. This connector provides a stereo send and stereo return insert for the stereo mix signal. The left/right send to this connector is the sum of all input channels and effects returns. The left/right returns are "Pre" the program, monitor and headphone controls. This allows a "what you hear, is what you get" adjustment when the expression pedal is operated.

This connector is only active when the Expression Pedal Switch is enabled. The operation of the pedal does not affect the levels from the cue, click, aux returns, and solo signal. For the pin assignment configuration for the 6 pin DIN connector and installation instructions, refer to the Interface Section of this manual.

### 8. Tuner Feed Jack

This unbalanced 1/4" T.S. phone type jack provides a dedicated feed to an external tuning device. The source for the output is either the sum of all signals feeding the program master or any signal(s) that are soloed.

If, for example, you need to tune only one synth module while others are active as well, simply depress its associated solo or PFL switch and it will be isolated to the tuner output.



**9. PFL Level Trim Control**

For SSM systems incorporating mono input channels, the Pre Fader Listen (PFL) level may be adjusted with this recessed trim pot. Use care when inserting a screwdriver as other components could be damaged.

**10. Program Feed Jacks (Unbalanced)**

These unbalanced 1/4" T.S. phone type jacks are the left/right outputs for the stereo program master. The signal present at these jacks is adjusted by the Program Master Control on the front panel.

The use of these connectors does not affect the operation of the balanced XL connectors.

**11. Program Feed Connectors (Balanced XL)**

The balanced left and right program feeds utilize the highest quality nickel core output transformers for hum rejection and sonic purity. The signal present at these connectors is adjusted by the Program Master Control on the front panel.

The left and right program feed is capable of driving up to three high impedance bridging inputs simultaneously. The program feed connectors are available for interface to the input of an external console, stereo tape recorders etc.

The use of the balanced XL connectors does not affect the operation of the unbalanced 1/4" connectors.

**Transformer Isolation**

As long as the potential for an electrical disparity exists between the Model SSM and any interconnected equipment not on the same AC circuit as the SSM (eg: a cue feed from a control room console), transformers will remain a key element in resolving some of the primary audio problems that may result such as unwanted hums and buzzes. Speck has provided input and output transformers in key positions on the mixer; cue and click inputs and the left/right program outputs. For more specific user information, refer to the sections on cue and click returns and program feeds.

**Program XL Pin Configuration**

The following chart represent the pin assignment for the balanced program feed XL connectors.

PIN 1 - GROUND PIN 2 - HIGH SIGNAL PIN 3 - LOW SIGNAL
---

**12. Program Ground Lift Switch**

When used, this switch disconnects the shields (pin 1) from the left and right balanced XL connectors thereby inducing any piece of gear interfaced at these points to search out a ground path external to the Model SSM. This can reduce the chance of ground loops and eliminate unwanted hums or buzzes.

The operation of the Ground Lift Switch does not affect the program feed's unbalanced 1/4" jacks.

**13. Monitor Feed Jacks**

These unbalanced 1/4" T.S. phone type jacks are available for hooking up a power amp that would be used for keyboard rack speakers or stage monitoring system. The signal present at these jacks is adjusted by the Monitor Master Control on the front panel.

**14. Stereo Headphone Jack**

This 1/4" stereo jack is a duplicate of the front panel headphone jack (see the front panel Master Section) allowing a second set of stereo headphones to be connected to the SSM.

Although not required, it is recommended that headphones of the same type and impedance be used when using the front and rear headphone jacks.

The tip of the stereo jack is the left headphone signal, and the ring of the jack is the right headphone signal.

**15. Transmitter Feed Jack**

This 1/4" jack is similar in operation to the headphone feed but with its signal level modified to allow interface to a wireless headphone system. The transmitter feed signal is a mono composite of the left/right headphone signals and may be updated in the future for stereo operation when stereo headphone transmitters become available.

The level for the transmitter feed is adjusted with the Headphone Master Level on the front panel. The use of the Transmitter Feed Jack does not affect the operation of the front or rear stereo headphone jacks.

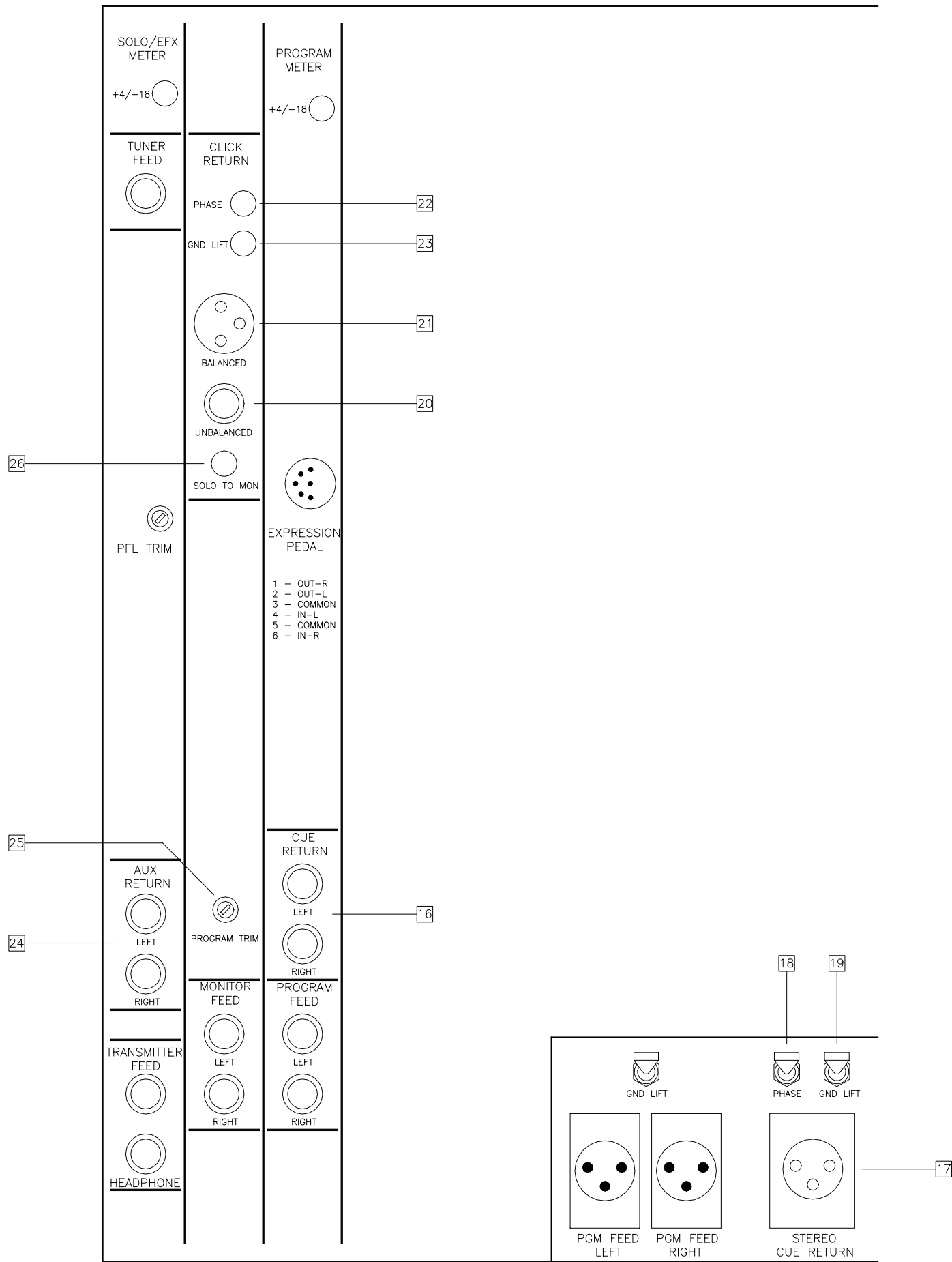


Figure 10. Cue, Click, Aux Return Connectors and Switches

Refer to Figure 10 for location of items 16 thru 26.

## **Stereo Cue Return Section**

### **16. Cue Return Input Jacks (Unbalanced)**

The Stereo Cue Return provides two means of connection. Two unbalanced 1/4" T.S. jacks and a XL transformer isolated input connector with phase reverse and ground lift switches.

These standard unbalanced 1/4" T.S. jacks are available for the connection of a stereo cue signal or any stereo audio signal. The use of the unbalanced 1/4" jacks does not affect the operation of the balanced XL connector.

### **17. Cue Return Connector (Transformer Isolated XL)**

This XL input connector provides transformer isolation for the Stereo Cue Return. This connector may be used for interface to an external consoles cue feed.

The use of the balanced XL connector does not affect the operation of the unbalanced 1/4" jacks, although it is possible that phase cancellation may exist if the Phase Switch is enabled.

Do not connect the speaker terminals of any power amplifier directly into the Cue Return input connectors.

### **Cue XL Pin Configuration**

The following chart represents the proper pin configuration for the Cue XL connector.

PIN 1 - GROUND PIN 2 - LEFT SIGNAL PIN 3 - RIGHT SIGNAL
---

### **18. Cue Return Phase Switch**

There is always the possibility that a balanced cue feed provided by, for example, a control room to the SSM may in fact be 180 degrees out of phase with the SSM's balanced input. This is the result of a non-conforming pin out configuration being applied to the SSM's balanced connector.

The operation of the Cue Phase Switch does not directly affect the phase of the unbalanced 1/4" jacks.

### **19. Cue Ground Lift Switch**

When used, this switch disconnects the shields (pin 1) from the associated balanced connector thereby inducing any piece of gear interfaced at these points to search out a ground path external to the Model SSM. This can reduce the chance of ground loops and eliminate unwanted hums or buzzes.

The operation of the Ground Lift Switch does not affect the Cue Return's unbalanced 1/4" jacks.

## Mono Click Return Section

The Mono Click Return provides two means of connection; a standard 1/4" jack and a balanced transformer isolated XL input connector with phase reverse and ground lift switches.

### 20. Click Return Input Jacks (Unbalanced)

A standard unbalanced 1/4" T.S. jack is available for the connection of a mono click signal or any mono audio signal that you would like returned to the Click Return Section. The use of the unbalanced 1/4" jack does not affect the operation of the balanced XL connector.

### 21. Click Return Connector (Balanced XL)

This standard female XL input provides balanced transformer isolation for the Mono Click Return.

The use of the balanced XL connector does not affect the operation of the unbalanced 1/4" connector, although it is possible that phase cancellation may exist if the Phase Switch is enabled.

### Click XL Pin Configuration

The following chart represents the proper pin configuration for the Click XL connector.

PIN 1 - GROUND PIN 2 - HIGH SIGNAL PIN 3 - LOW SIGNAL
---

### 22. Click Return Phase Switch

There is always the possibility that a balanced click feed provided by, for example, a control room to the SSM may in fact be 180 degrees out of phase with the SSM's balanced input. This is the result of a non-conforming pin out configuration being applied to the SSM's balanced connector.

When the Phase Switch is in the normal position (out) the high and low inputs of the isolation transformer are connected to pins 2 and 3 respectively. When the phase switch is depressed, pins 2 and 3 of the XL connector are reversed, pin 3 becomes the high input and pin 2 is the low input. The operation of the Click Phase Switch does not directly affect the phase of the unbalanced 1/4" jacks.

### 23. Click Ground Lift Switch

When used, this switch disconnects the shields (pin 1) from the associated balanced XL connector thereby inducing any piece of gear interfaced at these points to search out a ground path external to the Model SSM. This can reduce the chance of ground loops and eliminate unwanted hums or buzzes.

The operation of the Ground Lift Switch does not affect the Click Return's unbalanced 1/4" jacks.

**24. Aux Return Input Jacks**

These standard unbalanced 1/4" T.S. jacks allow the interface of an external stereo signal, such as a DAT, CD player or the output of Specks "Assign 28" subgroup module.

**25. Program Trim Control**

This recessed stereo trim pot controls the level of program signal (stereo mix) to the monitor and headphone feeds relative to the cue, click and aux returns.

There can be four signal sources feeding the monitor and/or headphone outs; the cue, click, aux and the SSM's stereo mix. As the first three each have a volume control, it is easiest to think of the Program Trim as a volume control for the SSM's stereo mix. The nominal setting (factory preset) for this trim control is fully clockwise.

The main program left/right feed and VU meter levels of the SSM remain unaffected by this adjustment of the Program Trim.

**26. Solo to Monitor Switch**

This pushbutton switch (recessed behind the rear panel) introduces the solo function, cue, click and aux returns to the master monitor outputs as well as the headphones.

In the normal position (off), the solo, cue, click and aux returns are removed, and only the stereo mix is present at the monitor feed. When this switch is depressed (on), both the monitor and headphone feeds receive the solo signal, cue, click, and aux returns together with the stereo mix. The operation of this switch does not affect the program feed.

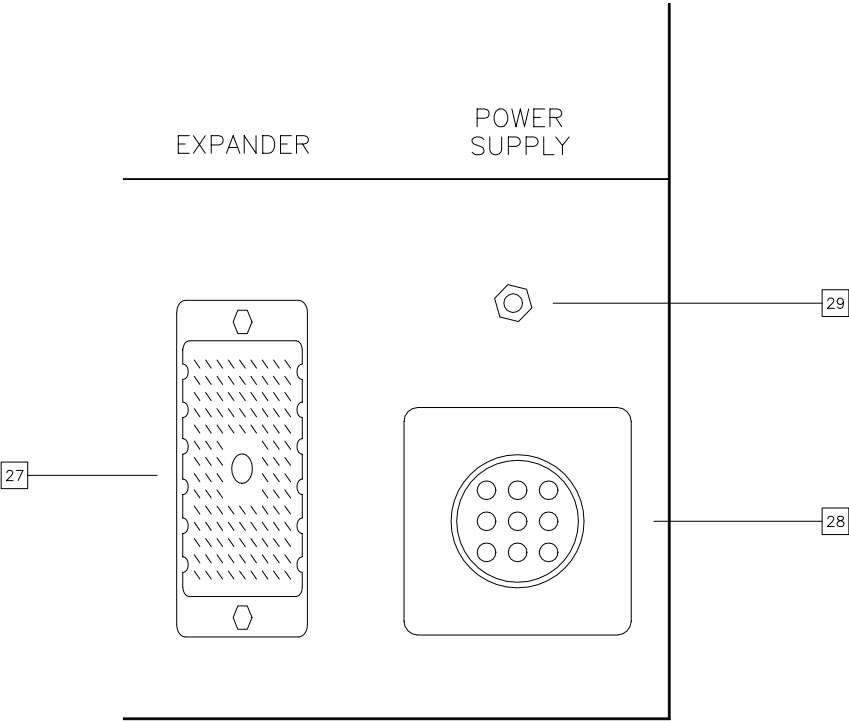


Figure 11. Expander and Power Supply Connectors

Refer to Figure 11 for location of items 27 and 29.

- |                                   |   |
|-----------------------------------|---|
| <b>27. Expander Connector</b>     | This multipin connector will accommodate any of the Model SSM Expanders for a potential of 56 inputs (28 stereo channels). For the proper pin out configuration and installation instructions, refer to the Interface Section of this manual.                   |
| <b>28. Power Supply Connector</b> | This 9 pin circular connector will accommodate the connector from the power supply cable. The connectors are keyed so they will only fit in one direction. For installation instructions refer to the Interface Section of this manual.                         |
| <b>29. Ground Terminal</b>        | This grounding terminal should be used when it is necessary to connect the Model SSM to a qualified ground. This terminal is internally connected directly to the metal chassis of the SSM and does not connect to the DC power supply common or audio grounds. |



# Wiring and Other

## General

It is assumed that in addition to the Model SSM, a considerable investment has been made in electronic equipment such as synthesizers, samplers, effects, and computers. We believe that the overall performance of the SSM and your mixing system is dependent on the condition and quality of this equipment.

A general discussion about AC, AC grounding, audio grounding, EMI, and quality wiring is discussed in this section. These subjects are very often overlooked or misunderstood, and should be given consideration when interfacing your equipment to any Speck product.

## Start Simple

A quality installation is essential when wiring any Speck product. When the time comes to actually interconnect your equipment, proceed slowing. Interfacing the many pieces of electronic equipment to your mixer should be a logical, methodical process.

Start by connecting your headphones or monitor power amp, and then add one synth to the mixer at a time; carefully listening and monitoring your progress. If a problem arises, such as a buzz, hum, intermittent signal, or nonexistent signal, stop at that point and solve the problem before proceeding.

## Audio Cable

Due to the high performance of the Model SSM mixing system, it is recommended that you use only the highest quality audio cable. A high quality cable by definition, is a cable that provides good mechanical strength, high microphonic noise immunity, high frequency response, low crosstalk and 100% shielding ability. All audio cable used with the Model SSM should be a 3 conductor foil shield type (2 inner conductors and a shield drain conductor). It is not recommended that the 2 conductor "off the shelf cables" be used.

## Multipair Wire Harnesses

When multiple cables are necessary (which is generally the case with our products), multipair cable should be considered as an alternative to individual cables. Multipair cable and harnesses are generally available in 4, 8, 12, 16, 24, and 32 pair.

## Connectors

All wire and cable interfaced to the Model SSM and Speck products should be terminated with high quality connectors. A 1/4" plug or XL connector should make a positive connection to its respective mating jack and provide adequate strain relief to its cable. All connectors should also have a metal shell to provide 100% shield for exposed conductors.

Feel free to check with Speck Electronics or your dealer when selecting cable and connectors. Our phone number is (760) 723-4281.

## Proper AC Grounding

When you are evaluating voltage and current requirements for your audio system, it is important that your SSM mixing system and/or rack system does not exceed the capacity of your AC service. You should make certain that the earth (green) wire for the AC system makes a reliable earth connection, and determine as best as possible that the AC system is free of noise that could generate unwanted audible sounds or cause problems in microprocessor based equipment.

### Quality AC System

When using a larger rack system it is recommended that a dedicated and isolated AC service be provided. This service should have its own AC wires, isolated receptacle, and breaker and not be shared with other unrelated equipment.

Even with an isolated AC system, it may still be necessary to make use of surge protectors, line filters, isolation transformers, or all of the above.

Power conditioners should be selected with care, since they sometimes generate undesirable switching noises in audio systems.

### AC Distribution

When connecting many pieces of electronic equipment to an AC system it is important that the AC is properly distributed. It is better to connect all plugs to a common AC source than to have AC receptacles in different locations.

When installing a large audio system, it may be necessary to consult a qualified electrician that is familiar with the specialized style of electrical wiring required for recording studios.

### **CAUTION!**

DO NOT REMOVE, DEFEAT, OR DISABLE THE SAFETY EARTH TERMINAL ON THE POWER CORD. DO NOT USE A GROUND LIFT ON THE POWER SUPPLY.

**Clock Noise and AC**

Clock noise is one of the greatest enemies of the audio racks AC system. If a synth or any microprocessor based device emits or somehow couples its clock signal with the neutral or earth of its own power cable, it will contaminate your AC system and carry the clock noise into other equipment; almost always with undesirable results.

**Safety Earth Connection**

The earth connection exists to protect you, your equipment and possibly your building from an electrical disaster. In a properly wired system, if a 120 volt AC wire were to break within your equipment's chassis, it should make contact with the Safety Earth Wire that is connected to the chassis, and blow the fuse or trip the circuit breaker until the problem has been corrected. Given the same circumstances, if the AC safety ground has been defeated with a ground lift or the AC service is incorrectly wired, the equipment's chassis and quite possibly everything attached in that rack would be "live" with 120 volts.

**Electronics Earth**

In an electronics context, an earth provides a path for unwanted EMI noise to be carried away from your audio equipment. If you disable your earth with a ground lift or do not have a reliable earth connection, the unwanted noise (EMI or RFI), will find an electrical path of least resistance. That will most likely be your audio equipment and would result in unwanted buzzes or hums.

**Proper Audio Grounding and Shielding**

In order for any audio signal, such as a synth signal to get from the synth to the mixer, it requires a minimum of 2 conductors. One conductor is the hot, or high, or whatever you are familiar with; the other conductor is the ground or common. Additionally, all audio wires must be protected from environmental occurrences such as EMI (Electro Magnetic Interference) and RFI (Radio Frequency Interference) with an outer shield. An outer shield protects the 2 inner conductors from outside interference, and prevents that cable from inducing its signal onto adjacent audio cables.

One common misconception is that the shield of a cable should act as the common. This may be acceptable for guitar cords or semi-professional applications, but not for professional applications. The audio signals must be carried only by the 2 inner conductors and the shield must act only to cover these 2 conductors without transmitting the signal from one location to another. It is recommended that the shield be attached to the common (ground) at one connector's end, and the shield not be connected at the other connector's end. It is recommended that all shields be connected at the mixer end, and the shields not be connected at the other ends (synths, effects, power amps, etc.).

If a patchbay is utilized in your mixing system, the rules for shielding change. With a patchbay, normally all shields are connected at the patchbay jacks, and not connected at the mixer or external audio equipment.

## EMI and RFI

The occurrence of EMI (Electro Magnetic Interference) and RFI (Radio Frequency Interference) in a synth and sampler based system should be of great concern and not overlooked when installing the Model SSM. EMI is defined as any unwanted signal which adversely affects the operation of the mixer or mixing system.

Stated simply, the undesirable effects of EMI may be perceived as a low frequency smooth sounding 60Hz hum; a low frequency "edgy" sounding 120Hz buzz; or a higher frequency "whine" caused by the timing circuits in microprocessor based devices.

Almost every electronic device generates some amount of EMI emissions. These emissions can be transmitted as electromagnetic radiation or simply conducted through audio cables and power cords. In the same respect, most electronic devices are also very susceptible to the EMI emissions generated by other electronic devices.

### Sources of EMI

There are natural and man made sources of EMI that you can't do anything about. These sources include radio, TV, and radar transmitters, as well as motors, lights, and computers. Even the Sun and atmospheric conditions can be contributors to noise that you experience in your audio system.

### Reducing EMI

There are generally three elements that must be present for EMI to exist. These include the source of the EMI (conducted or radiated), the propagation medium by which EMI is transmitted (directly on the cables or through the air), and the receptor that suffers the adverse affects of EMI. If any of these three elements are eliminated or reduced, the EMI interference will be eliminated or reduced.

The more electronic equipment operating within an equipment rack, the higher the EMI emissions. The more audio cable and low level audio equipment that exists within the same rack, the greater possibility of unwanted noise. The result of EMI in an audio system manifests itself as a buzz, hum, whine, or all three.

The most common EMI occurrence in an audio system is radiated emissions from microprocessors in synths and samplers, and magnetic field sources from transformers and power supplies.

## Balanced to Unbalanced Connections

When connecting the 1/4" unbalanced (TS) inputs and outputs of the Model SSM to balanced equipment, it will be necessary to configure your cables in order to unbalance the signal.

There are 2 types of balanced output circuits; transformer and transformerless (electronically balanced). Balanced audio outputs are normally terminated with 3 pin XL type connectors, 1/4" TRS (stereo) type jacks, or on rare occasions, with screw terminals.

When connecting the unbalanced (TS) input of the Model SSM to a transformer output, it will be necessary to connect the low (-) signal to the ground conductor; pin 3 to pin 1 of the XL, or the ring to the sleeve of a TRS plug. When connecting to a transformerless output, it is standard practice to connect to the high (+) output only and not connect the low (-) signal to ground. Check the manual of each piece of audio equipment for specific details.

Due to the lack of standards for XL connectors, some equipment may use pin 3 of the XL for the high signal. For this configuration, connect pin 2 to pin 1 on the XL, and connect the high to pin 3.

There are 2 types of balanced input circuits; transformer and transformerless (electronically balanced). Balanced audio inputs are normally terminated with 3 pin XL type connectors, 1/4" TRS (stereo) type jacks, or on rare occasions, with screw terminals.

When connecting the unbalanced (TS) output of the Model SSM to a balanced input it is almost always necessary to connect the low (-) input to the ground conductor; pin 3 to pin 1 for XL, or the ring to the sleeve of a TRS plug.

Due to the lack of standards for XL connectors, some equipment may use pin 3 of the XL for the high signal. For this configuration, connect pin 2 to pin 1 on the XL, and connect the high to pin 3.

Figure 12 below shows the recommended method of connecting the Model SSM's unbalanced jack to a balanced device.

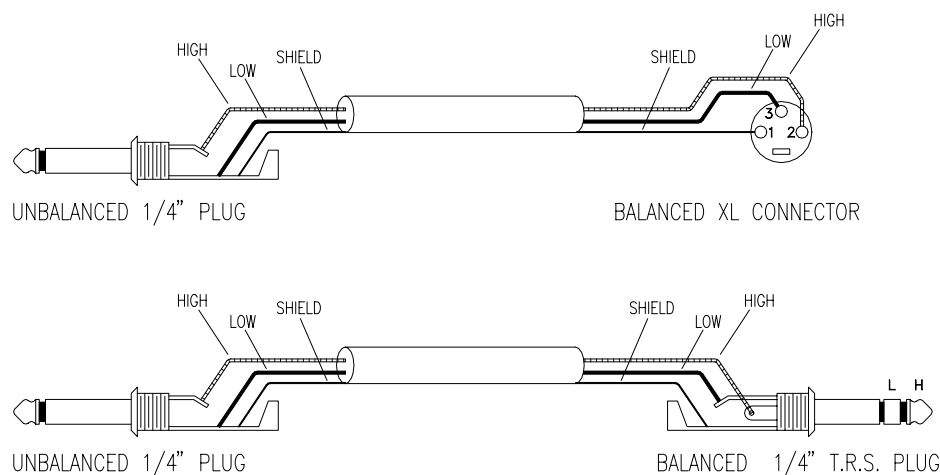


Fig 12. Balanced to Unbalanced Cables